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Greetings to our Readers

THIS, the first number of the *Journal* for the New Year, carries with it the cordial good wishes of the Editorial Board to all our members. We look back with satisfaction on much good work done by your officers and representatives on the Executive Committee and the Council during the year that has just gone. The foundations for material progress have been well and truly laid. We look forward, therefore, to the year that is before us with renewed confidence. To reach our objective, which is to form a powerful association that will represent the great majority of the medical practitioners in Canada and so become more truly national, enabling us as a profession to maintain our status and dignity and render more efficient public service, we need expansion. Our numbers have fallen off sadly during the past three or four years, with a corresponding reduction in our finances. We need our old members back, and we need many new ones. Let each of us look upon it as a duty to bring in at least one recruit. The coming year promises to be a crucial one in the history of the medical profession in Canada. We shall need, therefore, wise planning and effective action. The Association is not fighting for its own selfish aims; it is fighting the battles of the profession at large. Our call for greater support is, therefore, not unreasonable. We have in mind here, in particular, the field of Medical Economics in which events are rapidly hastening to a conclusion; what that conclusion will be depends largely on ourselves. If we fail to make our goal the results are likely to be disastrous.

We record with the greatest satisfaction the success of the effort to bring our profession into greater cohesion through the amalgamation of the various provincial associations with the national body. Seven of the nine provinces have pronounced in favour of the plan, and one of them, Alberta, has implemented the necessary legislation whereby the Alberta Medical Association is now The Canadian Medical Association (Alberta Division). Doubtless the other provinces will follow this good lead. A new Constitution and set of By-laws for the Canadian Medical Association have been adopted which not only will facilitate the conduct of its business but have been so framed as to serve as a guide to the provincial medical bodies if and when they elect to come into the larger fold. There is no doubt that this new relationship will make for strength.

Besides the reconstitution of our Association certain other major matters will engage our attention. These are Health Insurance, Maternal Welfare, the Cancer Campaign, and the Licensing of Specialists, all of which demand wise consideration.

A word as to the *Journal*. As the official organ of the Association we shall endeavour to increase its usefulness to the members and to the profession at large. In our judgment the *Journal* should be not merely a repository for medical papers and scraps of news. It is that, of course, but it should also aim to make the membership at large conversant with medical progress everywhere, with the business of the Association between annual meetings, and should serve as a forum for the interchange of ideas. Therefore, write for the column of "Letters, Notes, and Queries". The Executive Committee will be glad to know your opinions. Discuss the scientific papers if you like, and record your interesting experiences. Propound your difficulties. Expound your solutions. Join with us in making the *Journal* more thoroughly representative.

THE EDITOR.

AVERTIN: AN ANALYSIS OF 1600 ADMINISTRATIONS*

BY SIR FRANCIS E. SHIPWAY, K.C.V.O., M.D., B.CH.(CANTAB.),

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THE position of basal narcotics in the field of anæsthesia has become so assured, the public demand for some method of alleviation or abolition of anxiety or fear before operation has become so universal, that controversy over the wisdom of prescribing these friendly and powerful aids to the weakness of human nature has at last ceased. What has not ceased, and probably never will cease, is controversy over the relative value, safety and convenience of the many and increasing number of drugs of this nature which are at the command of the bewildered anæsthetist. Avertin was one of the earliest in the field. It has been on trial long enough for a fair and accurate estimate to have been formed of its advantages, disadvantages, and dangers. As one who was partly responsible for introducing it in 1929 to anæsthetists, I feel that an account of my stewardship is due, perhaps overdue, for no summarized data and final conclusions have as yet been published. The present moment seems opportune. Your Chairman has shown both by his friendly visit to the Centenary Meeting of the British Medical Association in 1932, when he presented a most instructive address on "The effects of Anæsthetics on the Liver",[1] and by his numerous experimental and clinical investigations of the various actions of avertin, how great is his interest in this drug. He has predicted an abiding usefulness for avertin. With this prophecy, rash though it may be, I am entirely in agreement. In this paper I propose to give a summary of 1,600 administrations of avertin, together with the indications and contraindications to its use, and an analysis of the deaths following operations in which it was used.

In the first 45 administrations in 1928-29, solid avertin was used; in the remaining 1,555 avertin fluid was used. One patient died (Case No. 8)[2]. This was a man, aged 68 years, alcoholic, and an old syphilitic, on whom gastrojejunostomy was performed; he had been given 0.12 g. per kilo of solid avertin, and morphine, gr. 1/6, and scopolamine, gr. 1/150. A considerable quantity of a mixture of chloroform and ether had been used to obtain relaxation. Death occurred a few hours later from respiratory failure, due to lack of the special nursing precautions now considered essential, and of specific antidotes to an overdose of avertin. The effective counteraction of an overdose by coramine and ephedrine was not known at that time. Avertin was used to procure complete narcosis, and morphine or morphine-scopolamine was given in every case. In 13 of these 45 cases, no other anæsthetic was necessary. In the remaining 1,555 cases in which avertin fluid was used both the dose of avertin and that of the preliminary sedative were gradually reduced, or the preliminary sedative was omitted, with the result that no fatality which could be attributed to avertin occurred when this drug was used as a basal narcotic.

TABLE I.

DOSAGE IN GRAMS PER KILO IN 70 CASES

	0.09g.	*0.1g.*	*0.12g.*	*0.125g.*	*0.13g.*	*0.135g.*	*0.15g.*
No. of cases	1	21	8	6	28	2	4
With morphine or morphine-scopolamine	1	20	8	6	28	2	4
Without		1					

Of the first 147 cases, morphine or morphine-scopolamine was given in 127, and the dose of avertin was in the great majority larger than 0.1 g. per kilo. (After this date the recommendation of Eichholtz to use an average dose of 0.1 g. per kilo was adopted). Whereas in these 147 administrations avertin was the sole anæsthetic on 22 occasions, in the following 1,453 administrations avertin gave complete anæsthesia in only 11 cases, in 3 cases no opera-

* A paper, slightly abridged, read by invitation at the combined Annual Meeting of the Canadian and American Medical Associations, Atlantic City, June 12, 1935.

tion was performed, in 3 ophthalmic operations were performed under cocaine, in 3 local anæsthesia with novocain was used, making a total of 20 cases without a general anæsthetic.

Looking back now on these 147 cases one is struck by the fact that in no single instance, except in the one quoted, was any anxiety felt for the safety of the patient during the operation or the recovery period. The conclusion which is irresistibly drawn, and strengthened by a study of the remaining 1,453 cases, is that the danger of avertin has been exaggerated. It is recognized, on the other hand, that pre-medication by morphine may lead to danger unless the dosage is carefully calculated. Avertin it will be remembered depresses the respiratory centre. Morphine is also a respiratory depressant. The combination of the two may lead to profound lowering of the sensibility of the centre to the normal stimulus, *viz.*, CO_2, to its failure to respond to abnormal stimuli, and finally to respiratory collapse. In the early days of avertin a fatality occurred which caused considerable comment at the time. This was the case of a healthy young man who was operated upon for the radical cure of hernia. He was given avertin, 0.1 g. per kilo, and morphine, gr. 1/4. He left the theatre in good condition, but later became cyanosed and died of respiratory failure in about seven hours.[3] Recently a somewhat similar case has been recorded; here the preliminary medication was morphine, gr. 1/4, and scopolamine, gr. 1/100, the dose of avertin, 0.1 g. per kilo, and the operation for exophthalmic goitre. Death occurred 5 hours later, consciousness not having been regained.[4] It is wrong to ascribe these fatalities to avertin. They would not have occurred had avertin alone been given. It must be clear that the clinical picture will be entirely altered if an amount of avertin sufficient to render a patient unconscious, with reduced respiratory volume, relaxed musculature, lowered blood-pressure, and diminished reflexes, is given after the injection of a drug which also depresses respiration and metabolism. I feel therefore that morphine, although exceedingly useful in the right place, should not be given without the most careful consideration of all the circumstances of the case. The risk should not be run except with the eyes fully open. Discredit, wholly unwarranted, will be thrown upon a drug the highest praise of which comes from those who have used it over a long period.[5, 6, 7] In the handling of difficult subjects it is wiser to prescribe a larger dose of avertin, the antidotes of which are known and are reliable.

There is another point worthy of mention. If a sedative or hypnotic has been given overnight some effect may still be present at the time of the administration of avertin; the administration in this case should be stopped as soon as signs of sleepiness appear. The barbiturates, if used as pre-narcotics, should be given at least one hour before avertin, in order that the full effect may be obtained and may be clearly evident. I confess that the combination does not appeal to me. The barbiturates are so capricious in the intensity and duration of their action that their exhibition may give rise to undue anxiety, particularly during the recovery period. Tolerance to avertin may develop with successive administrations. Maddox quotes the case of a child who was given avertin on five occasions at intervals of a few days for mastoid dressing; the doses had to be increased from 0.12 g. per kilo to 0.2 g. per kilo. This is the experience of all who have used avertin in a large number of cases.

Dosage.—The young, the robust, the highly nervous and excitable, drug addicts, and alcoholics tolerate avertin, generally speaking, better than their opposites. The obese, the

TABLE II.

DOSAGE IN GRAMS PER KILO IN 1453 AVERTIN ADMINISTRATIONS

	0.06g.	*0.07g.*	*0.08g.*	*0.085g.*	*0.09g.*	*0.095g.*	*0.1g.*	*0.11g.*	*0.12g.*	*0.13g.*	*Unknown**
With morphine	0	3	22	1	98	6	326	7	0	1	0
Without morphine	3	4	79	0	195	7	662	15	20	0	4
Totals	3	7	101	1	293	13	988	22	20	1	4

Total, 1453.
*Weight guessed.

cachectic, the anæmic, the toxic patients with low blood-pressure require a smaller dose than the normal. Here I wish to introduce a note of caution for the sake of the anæsthetist whose experience with avertin is limited. The finely-drawn athlete or the soldier who together with a rigorous abstinence from tobacco and alcohol has trained every ounce of fat off his body requires a smaller dose than the average. He comes into the category of the emaciated individuals who have depleted their carbohydrate reserves. Weight is only an approximate guide in determining the dose—age, temperament and habits are more important factors, and, of these, temperament has always seemed to me to be the best indicator. There is one class of patient which invariably calls for increased dosage. It includes the artist, the actor, the musician, and all those highly-imaginative people who live at a higher rate of nervous tension and possess less control than the ordinary being. These are, as a class, panic-stricken, and when given avertin fight to the last against the loss of consciousness. In some cases they succeed, although speech has become indistinct and perception of surroundings blurred. A few inhalations of a general anæsthetic suffice to abolish consciousness; amnesia is always complete, and no harm has been done to the psyche. *Great danger may be run, however, by giving a second dose of avertin, or of a preliminary sedative in the attempt to procure sleep, for once the activity of the higher centres has been abolished, the lower are exposed to the full and uncontrolled effects of the drug.*

Indications.—Avertin has been used for a wide variety of operations, and there would seem to be few conditions for which it is not suitable. It is pre-eminently suitable for those suffering from hyperthyroidism, diabetes, cardiac disease and most forms of pulmonary disease, from chronic bronchitis and asthma. It is invaluable for those whose experiences with anæsthesia have been unhappy, and in the field of psychiatry where the possibility of producing unconsciousness surreptitiously in maniacal patients has placed a weapon of the greatest importance in the hands of the surgeon. One patient of this class to whom I gave avertin underwent cholecystectomy and, at a later date, tonsillectomy with the happiest results. Age does not appear to be a factor which need influence our decision to use avertin; it does influence the amount of the drug to be given, and does also raise the question as to how far avertin or, for that matter, any rectal anæsthetic, is suitable for young children. This question must be answered in each individual case.

Contraindications.—Provided the dose be suitably adjusted the contraindications are exceedingly few. This statement, however, needs qualification. It should apply only to the anæsthetist who has had not only considerable experience in anæsthesia but in avertin anæsthesia. The practitioner who is called upon to administer anæsthetics on few and irregular occasions, or is but a beginner in this arduous and hazardous specialty, will be well advised to leave avertin severely alone. The chief danger lies in depression of the respiratory centre; the blood-pressure is also lowered. It is better, therefore, if there is any doubt in the mind of the anæsthetist, to withhold it in the case of advanced pulmonary tuberculosis, where the respiratory exchange is poor, in acute empyema, or states of drowsiness, whether caused by drug or toxæmia. Extreme thyroid deficiency or a condition of very low blood-pressure due to shock, hæmorrhage, sepsis, or cachexia would also, speaking generally, render the patient unsuitable for avertin in inexperienced hands. Colitis and intestinal obstruction should also be looked upon as contraindications. Cyanosis due to congenital heart disease or chronic valvular disease does not forbid its employment, although it does of course prescribe a smaller dose than the average.*

Since the main work of detoxication of avertin is done by the liver, the view has been held that patients suffering from cirrhosis or jaundice are unsuitable subjects for its administration. Avertin belongs to a group of drugs, the halogen group of organic compounds, which have a toxic action on the liver. This group includes chloroform and ethyl-chloride. Adrian[8] has stated that the results obtained by Parsons in his investigation of the effects of avertin on the liver of rabbits "though negative, are of considerable value, as they show that avertin has not the

* Deepening of cyanosis after absorption has occurred should be countered by a plentiful supply of oxygen and the maintenance of a free airway. It is true that coramine, ephedrine and carbon dioxide are efficient antidotes to excessive dosage of avertin, if given in time and with judgment. Washing out the rectum on the first sign of overdose such as slow shallow respiration and slow feeble pulse is also a measure not to be despised.

toxicity to the liver which seemed probable from earlier work.'' Bourne, Bruger and Dreyer,[9] using the bromsulphalein dye test in dogs, state that avertin occasionally produces impairment of function, but the degree is slight and gives good comparison with ether and the barbiturates. They conclude that it is less damaging than ether or chloroform. Professor Anschütz, of Kiel, informed me in 1932 that he no longer believed that avertin is a liver poison even if this organ were diseased. He had himself operated on 40 jaundiced patients with over 10 mg. per cent of bilirubin in the blood; one woman aged 65 years had severe jaundice with 18 mg. per cent bilirubin liver abscesses, whilst one patient had 19 mg. per cent bilirubin. All recovered. In a recent letter (November, 1934) he tells me that he continues to have good results with avertin in jaundiced patients, even when the bilirubin figure was four times the normal. After operation he gives a large intravenous infusion of 5 to 10 per cent glucose solution. He has completely given up ether for patients with severe jaundice.

Ashworth[10] has described three patients, two deeply, and one slightly jaundiced, who were operated on under avertin; all made good recoveries. Sebening[11] states that patients with diseases of the biliary tract show a certain prolonged detoxication. Van Zyl,[12] investigating liver efficiency by the lævulose test in 12 patients operated on under avertin and stovaine, concludes that avertin is only contraindicated if the deficiency in liver function is marked.

Madan[13] has obtained good results in cases of suppuration in the gall-bladder and of jaundice. Arnheim and Tuchman[14] found a negligible change in blood cholesterol in 15 normal patients given avertin. There are several instances in the literature both of the repeated administration of avertin and of the administration of large quantities for the relief of tetanus, eclampsia and mania. No harm resulted. My own experience in operations on the gall bladder has been satisfactory.

Children, who are notoriously susceptible to chloroform, should on *a priori* grounds be unsuitable subjects for avertin, which belongs to the same group of organic compounds. And yet out of 158 administrations to children of 12 years of age and under I have seen only one case in which jaundice developed, although I have given avertin twice to a child in 14 hours, normal recovery ensuing.

The conclusion to be drawn from a study of these cases and of the facts quoted is that the estimation of liver function is desirable but not essential. There is sufficient clinical evidence to show beyond any reasonable doubt that avertin may be administered in a dose suitably adjusted to patients suffering from jaundice, cirrhosis, or other forms of liver damage. Unfortunately it must be admitted that we have no reliable indication of the amount of impairment of function, and most of the tests are unsatisfactory in that they fail to indicate loss of hepatic function until a condition of fatal necrosis has developed. Clinical examination is, and must remain, for the present, the decisive factor.

To sum up, jaundice of a mild degree, which quickly cleared up, developed after 2 out of 1,600 administrations of avertin, namely, in a child with a long history of acidosis, and in an adult with fatty cirrhosis of the liver. In the first case some ether, in the latter a considerable quantity, had been given. On the other hand two jaundiced patients, both very ill, were operated on under avertin; both made uninterrupted recoveries.

Since the presence of glycogen in the liver cells seems to increase their power of resistance to toxic agents, glucose should be given freely before the administration of avertin, and if the liver function is impaired it should be given for twenty-four hours before operation and again at the end of the operation, either intravenously or per rectum. If avertin anæsthesia has to be supplemented by a general anæsthetic, nitrous oxide and oxygen is preferable to ether. Since it has been shown that reduction in the oxygen supply interferes seriously with liver function, cyanosis during administration of nitrous oxide and oxygen must be avoided. If difficulty is anticipated in obtaining abdominal relaxation without recourse to ether it should be obtained by the injection of a local anæsthetic.

The effect of avertin on the kidney function is to produce marked depression for one or two hours in animals, but much less in man, probably because of the smaller dose employed. Bolliger and Maddox[15] found that avertin anæsthesia without surgery produces no ill effects in uræmic dogs. Excretion was slow but recovery was complete. Pitt[16] has recently investigated at Guy's

Hospital the effect of avertin on the renal function in patients suffering from a variety of conditions. Nitrous oxide and oxygen, or a minimal amount of ether in addition, was used as the supplementary anæsthetic. Blood-urea estimations were made before and after operation by Archer's micro-urease method. All urine passed during the following days was collected and examined. Pitt concluded that nitrogen excretion is less upset by avertin than by chloroform and ether. There is a slight rise after avertin, nitrous-oxide and oxygen anæsthesia on the day following operation. A complete cessation of kidney function which lasts for 20 to 90 minutes frequently follows the administration of avertin. The upset of function does not assume dangerous proportions in the older patients; in fact avertin appears to be slightly more favourable in this respect than chloroform and ether.

Fifty-three nephrectomies have been performed under avertin (Table III); nitrous-oxide, oxygen, with or without the addition of a minimum amount of ether or vinethene, was the supplementary anæsthetic. Three patients died, one on the fourth day from peritonitis, verified by autopsy, one on the fifteenth day, from pulmonary embolism (the ureter had also been removed) and one in thirty hours from circulatory failure. This patient was aged 64 years, and was very toxic in consequence of a long standing pyonephrosis; the operation was difficult on account of dense adhesions. In 40 cases the kidney has been operated on for removal of calculi. There has been no fatality. Forty-four prostatectomies have been performed by the open method and 23 by Freyer's operation. Of the former, 2 were second stage operations, and of the latter, 7. The decision *when to operate* and *what operation to do* has been formed partly from a consideration of the general condition of the patient, particularly from the cardio-vascular point of view, and partly from an estimation of the results of the investigation of the blood-urea and of McLean's test for urea excretion. In the final analysis due emphasis must be laid upon the efficiency of the cardio-vascular system. In the long run the excretion of urea must depend very largely upon the maintenance of an adequate arterial pressure in the kidneys. A low blood-pressure and a severe degree of arteriosclerosis are therefore viewed with suspicion, and call for the minimum of surgical interference and the employment of a non-toxic anæsthetic, even though the tests of renal function may be considered to come within safe limits. Further, every effort is made to maintain the blood-pressure during the post-operative period. No patient who has been judged suitable for operation has been refused avertin on the grounds of renal deficiency.

One patient died from cardiac failure, one from acute obstruction caused by an unsuspected growth of the lower bowel, and one from septicæmia; the prostate in this case contained an abscess. Two patients died from paralytic ileus. In the present state of our knowledge these fatalities cannot be attributed to avertin or indeed to any anæsthetic. Bonney in his Bradshaw Lecture, 1934,[17] attributes this complication to

TABLE III.

NATURE OF OPERATION

1.	Face	21
2.	Mastoid	36
3.	Eye	5
4.	Nasal septum and sinuses	136
5.	Mouth	41
6.	Tonsillectomy	220
7.	Pharynx and Larynx	9
8.	Neck	14
9.	Goitre—Exophthalmic	22
	Adenoma	17
10.	Chest	18
11.	Breast	43
12.	Abdominal:	
	Upper	27
	Lower	13
	Stomach	32
	Bowel	41
	Incisional hernia	11
	Appendicectomy	156
	Ovary, uterus, tubes	43
	Various	3
		908
13.	Gall-bladder—Removal*	45
	Drainage	10
14.	Radical cure of hernia	62
15.	Kidney—Removal†	53
	Calculi	40
16.	Bladder	137
17.	Prostate—Open operation‡	44
	Freyer	23
18.	Rectum	27
19.	Hæmorrhoids	26
20.	Genitalia	35
21.	Cervix and curettage	53
22.	Limbs	108
23.	Miscellaneous	29
		692

*In 6 cases appendicectomy performed.
In 1 case appendicectomy and ovariotomy performed.
In 1 case partial colectomy performed.
In 2 cases appendicectomy and cascostomy performed.
†In 2 cases ureter also removed.
In 1 case testis also removed.
‡In 2 cases vasotomy performed.

TABLE IV.

ANALYSIS OF FATALITIES

No.	*Sex*	*Age*	*Injection*	*Dose p. kilo*	*Other Anæsthetics*	*Operation*	*Time After Operation*	*Cause*	*Remarks*
8	M	68	Morph. gr. 1/6 Scop. gr. 1/150	0.12g.	C, E, O_2	Gastro-jejunostomy	7 hours	Overdose	Autopsy. Syphilitic atheroma. Cirrhosis of liver. Fatty heart.
65	F	16	Morph. gr. 1/6 Scop. gr. 1/150	0.1g.	N_2O, O_2, E.	Thyroidectomy (Exophthalmic)	4 hours	Shock	Apex beat ½ inch outside nipple line.
147	M	33	Atrop. gr. 1/100	0.1g.	Novocaine, N_2O O_2	Thoracoplasty	2 weeks	Cerebral abscess	Autopsy. Multiple abscesses in brain.
246	M	47	Atrop. gr. 1/100	0.1g.	Novocaine, E.	Appendicectomy	5 days	Obstruction	No autopsy.
326	M	42	Morph. gr. 1/6 Atrop. gr. 1/100	0.1g.	N_2O, O_2, E.	Appendicectomy	10 days	Pulmonary embolism	Autopsy.
359	M	24	Atrop. gr. 1/100	0.1g.	N_2O, O_2, E.	Nephrectomy	4 days	Peritonitis	Autopsy.
454	M	61	Morph. gr. 1/8 Atrop. gr. 1/100	0.1g.	N_2O, O_2, E.	Resection growth of colon	5 days	Peritonitis	No autopsy.
559	M	60	Atrop. gr. 1/100	0.09g.	N_2O, O_2	Radium into growth of lung	36 hours	Cardiac failure	No autopsy.
605	F	50	Atrop. gr. 1/75	0.09g.	N_2O, O_2	Exploratory laparotomy	36 hours	Bronchitis	19 st. 10 lbs. Alcoholic, bronchitic. No autopsy.
657	M	77	Atrop. gr. 1/100	0.09g.	E, O_2	Prostatectomy (open operation)	1 week	Cardiac failure	Arterio-sclerosis. Extra-systoles. No autopsy.
705	M	58	Morph. gr. 1/6 Atrop. gr. 1/100	0.1g.	Novocaine, N_2O, O_2, E.	Exploration of pancreatic duct	4 days	Pancreatitis	No autopsy.
782	F	96	Nil	?0.07g.	Cocaine	Cataract	6 days	Bronchitis	Blood urea 93 mg. per cent. Urea concentration test 1.4 per cent. No autopsy
822	M	74	Atrop. gr. 1/100	0.09g.	Novocaine, N_2O, O_2	Prostatectomy	5 weeks	Septicæmia	Abscess in prostate. No autopsy.
823	M	68	Atrop. gr. 1/100	0.1g.	E.	Passing Souttar's tube	40 hours	Mediastinitis	Œsophageal carcinoma. No autopsy.
924	M	66	Atrop. gr. 1/100	0.09g.	Novocaine Chloroform for 10 mins.	Prostatectomy	8 days	Uræmia	Autopsy. Stomach, small, intestines dilated. Free fluid in peritoneal cavity. Kidneys, liver, spleen, normal.
953	F	55	Nil	0.07g.	N_2O, O_2	Exploratory laparotomy	36 hours	Peritonitis	Appendix abscess 6 weeks before. No autopsy.
996	M	62	Atrop. gr. 1/100	0.1g.	Novocaine N_2O, O_2, E.	Prostatectomy (2nd stage)	5 days	Paralytic ileus	Autopsy. Intestines greatly distended. Flakes of lymph on peritoneum.
1015	F	34	Morph. gr. 1/6 Atrop. gr. 1/100	0.1g.	N_2O, O_2	Acute gangrenous appendicitis with peritonitis	6 days	Peritonitis	No autopsy.
1076	M	70	Atrop. gr. 1/100	0.09g.	Novocaine, N_2O, O_2	Prostatectomy (open operation)	76 hours	Paralytic ileus	No autopsy.

TABLE IV.—Continued

ANALYSIS OF FATALITIES

No.	*Sex*	*Age*	*Injection*	*Dose p. kilo*	*Other Anæsthetics*	*Operation*	*Time After Operation*	*Cause*	*Remarks*
1082	M	73	Atrop. gr. 1/100	0.09g.	N_2O, O_2	Passing Souttar's tube for œsophageal carcinoma	4 days	?Paralytic ileus ?Pulmonary embolism	No autopsy.
1099	M	22	Atrop. gr. 1/100	0.08g.	E, O_2	For acute intestinal obstruction	11 hours	Obstruction	12 ft. gangrenous small gut. No autopsy.
1224	M	64	Atrop. gr. 1/100	0.08g.	N_2O, O_2	Nephrectomy	30 hours	Circulatory failure	No autopsy.
1303	M	60	Atrop. gr. 1/100	0.1g.	N_2O, O_2 Vinethene	Removal kidney, ureter	15 days	Pulmonary embolism	No autopsy.
1397	M	45	Morph. gr. 1/6 Atrop. gr. 1/100	0.1g.	N_2O, O_2	Amputation through thigh	1 week	Pulmonary embolism	Diabetes. No autopsy.
1406	M	68	Atrop. gr. 1/100	0.09g.	Novocaine,E.	Prostatectomy (open operation)	6 days	Obstruction	No autopsy.
1494	M	47	Atrop. gr. 1/100	0.09g.	N_2O, O_2, E.	Partial gastrectomy	5 days	Peritonitis	Autopsy.
1532	M	50	Atrop. gr. 1/100	0.09g.	Cyclopropane	Draining gall-bladder and common bile duct, appendicectomy	48 hours	General peritonitis and hypostatic pneumonia	Autopsy.
1545	F	40	Atrop. gr. 1/100	0.09g.	N_2O, O_2, E. Vinethene	Removal of gall-bladder (adhesions, old perforations)	72 hours	Hæmorrhage	Autopsy.

the generation of some agent in the traumatized tissue "in or in close relation to the peritoneal cavity" which sets up motor and vasomotor disturbances in the intestines.

Pulmonary complications. — Pulmonary complications have arisen in 6 cases, and in 5 of them an infection of the respiratory tract was already present. Although a patient who underwent a repair for umbilical fistula was given nitrous-oxide and oxygen he developed a most serious illness involving first one lung and then the other. His case demonstrates the supreme importance of enquiry into the patient's recent history, particularly in the winter months when so many of the hospital class are inclined to take a "cold" for granted and to conceal the fact for economic reasons. *No patient died from a pulmonary complication.* No patient has been refused avertin because of bronchial or pulmonary infection, in fact, it has been in this very class that avertin and nitrous-oxide and oxygen has been the anæsthetic of selection, whether for an intra-nasal, abdominal, biliary tract, renal, vesical or prostatic operation.

Fatalities.—The causes of death call for little explanation. Reference has already been made to case number 8[2] in which avertin and morphine-scopolamine had been used to produce complete anæsthesia before the danger of this method had been recognized. An old lady of 96, who was restless and wandering, absorbed sufficient avertin, and no more, to make operation under local anæsthesia just possible. She was able to take tea shortly afterwards; bronchitis set in on the third day and death took place on the sixth day. In case 1,082 death was probably due to paralytic ileus. Considerable force had been used in inserting the tube and morphine given for the relief of pain. The abdomen became distended on the second day, the patient was reading his paper on the morning of the third, but died suddenly in the early afternoon, probably from asphyxia due to increasing pressure on the diaphragm. It is unfortunate that acetylcholine was not used in this case. It is worthy of note that whereas three patients died from paralytic ileus after extra-peritoneal operation, no instance has occurred of fatal or

even an alarming degree of ileus after operation within the peritoneal cavity.

SUMMARY

1. The dosage of avertin should be individual.

2. Given in accordance with established principles avertin can be used with complete safety.

3. Drugs which depress respiration should not be given before avertin until the anæsthetist has gained full experience of its action. Larger doses of avertin are preferable in difficult subjects.

4. Liver and kidney disease are not contra-indications to its use, but call for reasoned dosage; nitrous oxide and oxygen is preferable to ether.

5. Avertin reduces post-operative morbidity and mortality.

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AN EXPERIMENTAL PRODUCTION OF CORONARY THROMBOSIS AND MYOCARDIAL FAILURE

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INTRODUCTION

UNDER normal conditions we may assume that the sympathetic and parasympathetic divisions of the autonomic nervous system, which are synergistic in function, are in equilibrium, and that any disturbance of the physiological balance of these nerves must result in physiological dysfunction and later in pathological changes of the dually innervated visceral organs.

Vagotonia and sympatheticotonia, classified as to the relative reactivity of the sympathetic and parasympathetic nerves, have long been recognized as clinical entities, but their relation to common as well as obscure symptom-complexes appears to have been neglected.

Physiological dysfunction of a group of central nuclei may in turn produce a symptom-complex, from an increase in functional activity in the respective divisions of the autonomic nervous system, which may affect the whole nervous system or only a special part of it. However, vagotonia and sympatheticotonia do not necessarily imply hyperirritability or physiological dysfunction of the nerve centres involved, but, we think, may be produced by an excess of stimulating substances in the blood.

The work here reported, begun in 1933, deals only with repeated intravenous injections of the stimulating substance in the blood which simulates parasympathetic activity, namely, acetylcholine.

METHODS AND MATERIALS

Concentrated solutions of acetylcholine iodide (Hoffman-La Roche) or acetylcholine bromide (Eastman) were prepared, placed in rubber-capped vials, and sterilized (1 c.c. = 25 mg. acetylcholine). For injection purposes a 1/10,000 solution was used, prepared by dissolving 2 c.c. of the concentrated solution with 500 c.c. of sterile normal saline. Each dog received this amount daily, regardless of his weight and physical condition.

The dogs were trained to lie on the right side and to maintain this position throughout the injection period of 90 minutes. Using a

Woodyatt pump, injections were made into the leg vein (No. 21 needle) at the rate of about 5.5 c.c. per minute. For this type of chronic survival experiment we found that a Marriotte cylinder with an air trap was more satisfactory, and consequently replaced the Woodyatt in all our later experiments (see diagram).

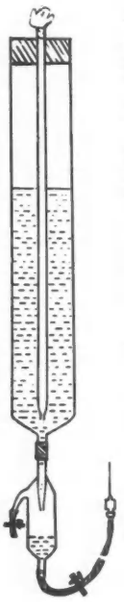

DIAGRAM.—Constant pressure cylinder as used in our continuous intravenous injections—modification of a Marriotte bottle.

In the hope of correlating any clinical symptoms with the experimental results, routine procedures were carried out on each dog. Initial values of the following were obtained over a period of at least one week prior to the commencement of the injection, and then routinely carried out each week.

1. Blood cultures and smears, red and white cell counts, viscosity and percentage hæmoglobin determinations.
2. Blood-pressure determinations, made by direct readings from the femoral artery (Dameshek and Loman, 1932), using, however, a filled system of freshly-boiled citrate solution.
3. In order to determine the effect of repeated flooding of the system by acetylcholine on the choline-esterase of the blood, estimations were made on the blood-serum, using a modification of Steadman's titration method (Lucas, Hall and Ettinger, 1935).
4. An endeavour was made to estimate each animal's exercise tolerance.
5. As a further check on the cardiac rate and condition electrocardiograms were taken. Three sets were taken on each dog previous to any injection. These served as normals for the individual dogs. Electrocardiograms were taken more frequently as the developing clinical condition of the animal became more serious.
6. Initial and weekly weighings were also taken of each dog.

The following daily routine was carried out.—

I. Before each experiment the animal was made to lie quietly for 10 minutes, and the resting heart and respiratory rates were recorded. Since in the unanæsthetized dog a continuous intravenous injection of acetylcholine in amounts up to 1 mg. per minute always causes acceleration of the heart, the heart-rate during injection was taken as an index of the action of the acetylcholine solution, and was recorded regularly by auscultation. During injections the heart-rate was taken every minute for the first five minutes and then every five minutes throughout the injection. Respiratory rates were taken every fifteen minutes.

II. Rectal temperatures were taken each day before injection. Room temperatures were also noted.

The experiments were carried out on 8 dogs arranged in two groups: A—young dogs (Nos. 4, 5, 6, 9); B—older dogs (Nos. 3, 8, 46, 47). These animals were injected daily, seven days in the week, until they died.

EXPERIMENTAL RESULTS

CARDIOVASCULAR

1. *Heart-rate.*

The resting heart-rate of the dog varies considerably from day to day, a normal for our dogs being about 80 to 100 per minute. Before the start of the injection the heart-rate of any individual dog for that day was quite constant. Within 10 to 20 seconds after the start of the injection the heart-rate always was greatly accelerated, even to two or three times the resting normal rate. Throughout the 90 minutes of injection the rate often varied considerably from the normal to 150 to 240, to 100 to 190, etc. for ½ minute counts, taken at five minute intervals by means of a stethoscope. Rates over 250 were frequently encountered but the beats could not be accurately counted. Some of the animals, after showing clinical signs of myocardial failure, developed a tolerance to acetylcholine to such an extent that there was either no, or a very slight irregular, increase in heart-rate with injection. In D 5, in whom this tolerance was very noticeable, the dyspnœa and other clinical signs seemed to be much more severe than in those dogs which showed only a slight tolerance. When the injection was completed and the needle withdrawn the heart-rate always decreased to almost the resting normal level within 20

seconds, and within 2 minutes had returned to the normal again.

Electrocardiograms taken synchronously with the start of the injection showed strikingly the very rapid increase in heart-rate, and, as well, the sudden decrease in heart-rate when the acetylcholine injection was stopped. That the cardiac acceleration by acetylcholine was not a volume-effect was shown by control experiments in which normal saline was injected under identical conditions.

2. *Heart-sounds.*

Following the heart-rate so consistently by auscultation it was easy to detect the development of systolic murmurs in every dog. So great is the difficulty in localizing cardiac murmurs in the dog that we made no attempt at their definite classification, other than to distinguish them as systolic. The murmurs at first were very slight and were not constantly present, but within a few days they became quite harsh, blowing in type, and constant throughout the day and night. Later, the murmurs became progressively rougher and louder, and eventually both first and second sounds were practically indistinguishable. The rapidity with which these murmurs developed varied greatly in the different dogs, in the old dog group being detected after 12 to 19 continuous daily injections. In the younger dogs the murmurs developed after 34 to 136 days (although one in 7 days).

Following the development of the systolic murmurs the clinical course was unchanged for many weeks except in one animal which developed extrasystoles and another, a partial heart-block.

All the animals showed terminal signs of cardiac failure, *viz.*, decreased exercise-tolerance, dyspnœa, râles and cyanosis. Diastolic murmurs developed coincidently. These signs became progressively more pronounced until the animals died.

The death of 3 animals occurred while under observation in the laboratory. The others died unexpectedly during the night. In those observed cases the animals showed signs of genuine cardiac distress, whimpered, gasped for breath, expelled some frothy fluid, became very cyanosed, unconscious and died. In one case the animal had two severe attacks, each lasting a minute or more, before the fatal attack. Each of the other two observed dogs had but the one attack, lasting about one minute.

3. *Electrocardiographic changes.*

In the old dogs which showed coronary arterial damage at autopsy the most serious early electrocardiographic changes were evident. In D 3 there were bouts of ventricular extrasystoles. D 8 showed a progressive prolongation of the P-R interval from the normal of 0.1 seconds to 0.4 seconds, and an occasional heart-block. Other dogs had slight prolongation of their P-R interval. Diphasic and inverted T waves were an inconstant finding, but, terminally, the T waves showed high voltage and a high take-off.

4. *Observations on blood-pressure during injections.*

Following the injection of acetylcholine in the unanæsthetized animal the blood-pressure fell rapidly from about 120 to 85 mm. Hg. and remained low. This was associated with a maintained increase in heart-rate, which was inversely proportional to the blood-pressure. There was no permanent change in blood-pressure as recorded weekly by the direct arterial method. During the actual injection periodic flushing of the skin was very common. In some cases the flushing persisted throughout the injection period. This peripheral vaso-dilatation was very marked about the mucous surfaces. When the injection was discontinued the peripheral vaso-dilatation disappeared and the blood-pressure returned to normal within 20 seconds.

5. *Esterase.*

The normal serum-esterase value* has a fairly narrow range for the same dog (Lucas, Hall and Ettinger, 1935). The continuous daily injection of 500 c.c. acetylcholine solution (= 50 mg. acetylcholine) did not produce any marked change in the esterase value from week to week throughout the life of the animals. This enzyme system appears to be very stable and efficient. Normally, very small quantities (0.06 to 0.6 mg. per litre) of acetylcholine are present in whole blood of the dog (Ettinger and Hall, 1934). On several occasions estimations of esterase were made from blood taken before,

* A unit has been defined in this laboratory as the concentration of enzyme which liberates 1.00 c.c. of 0.01 N acid when 0.50 c.c. of serum acts on 25 mg. of acetylcholine in a total initial volume of 11.5 c.c. at a pH of 8.0 and temperature of 37.5°.

during, and immediately following a daily injection of 500 c.c. acetylcholine solution. The values in these determinations were practically constant.

6. *Blood examination.*

Weekly values for the red blood-cell count, white blood-cell count, hæmoglobin and blood viscosity all remained within normal limits.

7. *Weight.*

The dogs were weighed individually each week. All dogs either maintained or increased their weight during the progress of the experiment until such time as their exercise-tolerance, general condition, appetite, etc., became poor.

8. *Blood cultures.*

Blood cultures on all dogs were repeatedly negative until the animals were in the final stages of cardiac failure, when the blood of 3 animals showed a terminal infection with *B. pyocyaneus.* In control experiments *B. pyocyaneus* caused no damage to the heart.

GASTRO-INTESTINAL SIGNS

1. *Salivary.*

During each injection-period throughout the experiments salivation was very profuse. In two of the dogs the volume of saliva secreted during the 90 minutes of injection totalled between 70 to 150 c.c. each. In those dogs which developed a marked tolerance to acetylcholine, as evidenced by very slight cardiac acceleration, the amount of salivary secretion did not diminish.

2. *Gastric and intestinal.*

Retching and vomiting were very common occurrences during the earlier injections. The vomitus was foul-smelling and contained much undigested food from the previous day's feeding. As the acetylcholine tolerance developed, retching and vomiting occurred much less frequently. Towards the end of each individual animal's experiment occasional hæmatemesis occurred. Diarrhœa was very common during the pre-tolerance stages of the experiment; later the stools were better formed. Blood-streaked stools and melæna were frequently observed, probably an effect of extreme mucosal vaso-dilatation.

AUTOPSY

Abdomen.

The animals were well nourished, with normal supplies of subcutaneous and omental fat. The intestines appeared bluer than normal, but glistening and shining. When the gastro-intestinal tract was removed and opened much blood-stained material was found. The gastric mucosa showed much congestion, and in places was partially absent. In the small intestine large, severely congested, patches were superimposed upon a generalized mild congestion of the whole submucosa. This congestion extended down to and often beyond the ileo-cæcal junction. The many scattered Peyer's patches, extending almost throughout the whole small bowel, appeared to be most affected.

The liver appeared dark and mottled, typical of chronic passive congestion. The kidneys were usually normal-looking, with the capsule stripping easily. On the cut surface the cortex and medulla were clearly defined. In one case, D 3, two large infarcted areas were noticed; the rest of the kidney substance was congested.

Thorax.

Heart.—The pericardium was usually smooth and glistening, the heart lying free in the sac. In most cases the latter appeared soft and large. A spotty, surface congestion was often noticed. In many of the hearts small, whitish, linear and round spots were seen on the surface, while in D 3 a large, typical scar was observed, situated on the anterior surface of the left ventricle about half-way between the apex and the junction of the anterior coronary and its anterior descending branch. The myocardium (in 5 out of 6) felt soft and somewhat flabby. In several cases different papillary muscles appeared weak and infarcted.

Lungs.—The lungs appeared congested in the lower lobes. Most lobes felt soft and spongy and on the cut surfaces oozed frothy, blood-tinged fluid. In most cases many cubic centimetres of fluid were found in the pleural cavity.

Microscopic examination.

1. Sections of lung showed definite evidence of congestion and œdema.

2. Liver—chronic passive congestion.

3. Spleen—Malphigian corpuscles somewhat enlarged; large deposits of hæmosiderin.

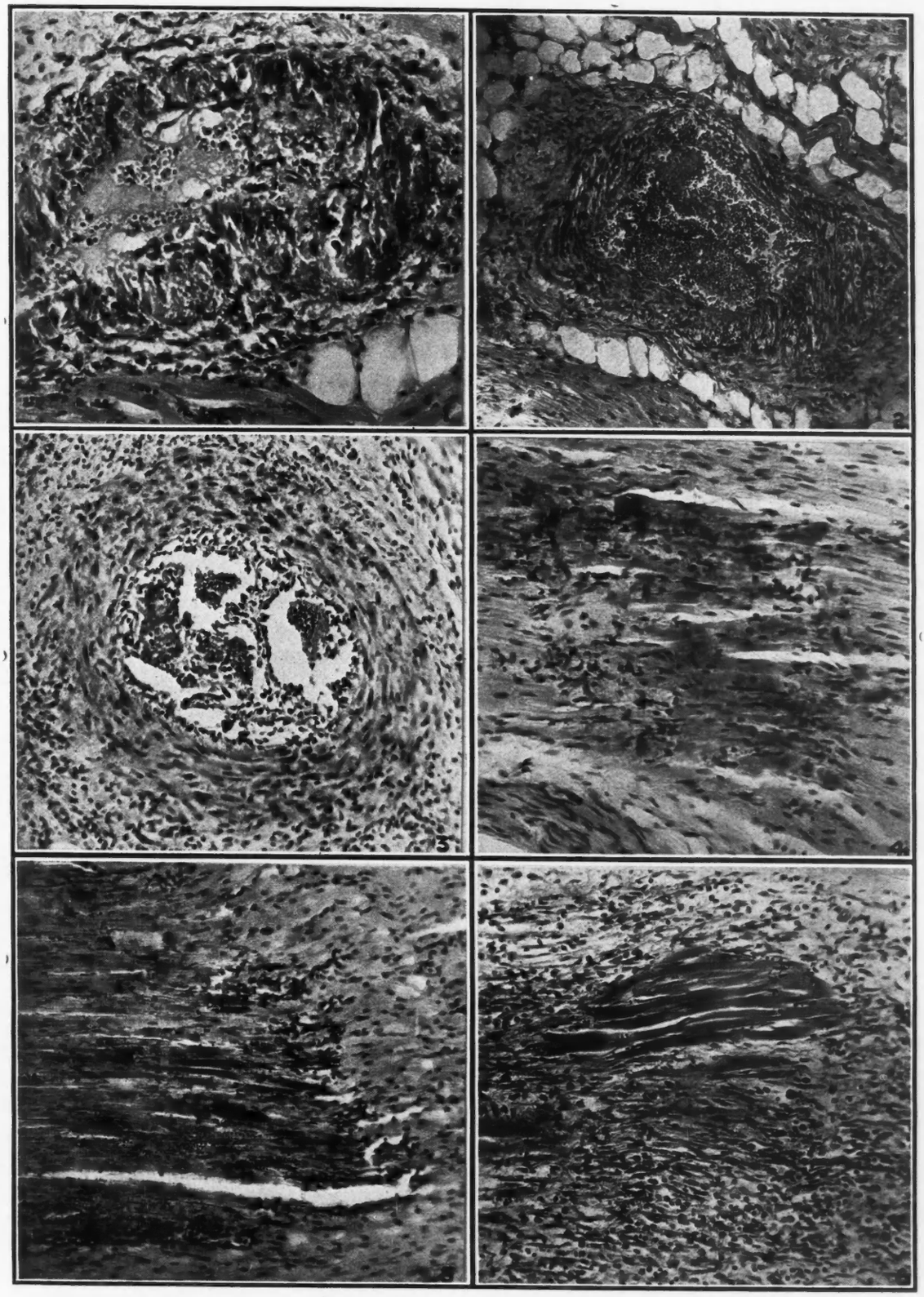

Fig. 1.—Hyaline degeneration of media, with thrombosis of artery. **Fig. 2.**—Thrombosis of coronary artery with beginning organization. **Fig. 3.**—Recanalization of thrombosed coronary artery. **Fig. 4.**—Patch of hyaline degeneration of myocardium. **Fig. 5.**—Large infarcted area with beginning fibrosis. **Fig. 6.**—Large area of fibrosis—typical scar.

4. Kidney—in D 3, very definite evidence of infarction with some fibrosis; rather severe arteriolar sclerosis and thrombosis. In the other cases little or no degeneration of the vessel walls was found.

5. The mesenteric vessels in D 3 were also thrombosed, with degeneration of media and intima.

6. Adrenal—cortex and medulla well defined; no changes noted.

7. Pancreas—no definite changes noted.

8. Intestines. — Sections taken through the more intensely congested areas showed mucosal congestion with small hæmorrhagic areas scattered throughout. Blood cells were found lying between the villi. Whether the melæna, as mentioned before, was due to rhexis or a diapedesis could not be definitely determined. In any event, areas were found where the villi were flattened and desquamation of the lining cells had taken place. No emphasis could be placed on the absence of much of the lining epithelium. All the above sections were stained with hæmatoxylin-eosin.

9. Heart.—Sections of heart were taken routinely according to the following outline: (*a*) cross-section through anterior coronary with the left descending branch, including cross-section of right and left ventricles; (*b*) flat section of right ventricle; (*c*) flat section of left ventricle — near apex; (*d*) flat section of papillary muscle — right and left; (*e*) cross-section of papillary muscle — right and left; (*f*) cross-section through septum; (*g*) cross-section across posterior coronary artery; (*h*) through S.A. node.

Examination of the above sections of the heart showed:

(*a*) *In old dogs:*

(i) Areas of hyalinization with developing fibrosis; (ii) hyaline degeneration of the media of medium and smaller sized arteries with fibrosis (Fig. 1); (iii) recent infarcts of myocardium, including papillary muscles; (iv) thrombosis of many branches of coronary artery (Fig. 2); (v) recanalization of occluding thrombi (Fig. 3); (vi) fatty degeneration of myocardium about infarcted areas; (vii) large areas of fibrosis (Fig. 6).

(b) *In young dogs:*

(i) No arterial changes; (ii) mild to severe hyaline degeneration of myocardium (Fig. 4); (iii) a few scattered hæmorrhagic areas with cellular response; (iv) very recent infarcts of papillary muscle (D 6) (Fig. 5).

In two young dogs (D 5 and D 9) no pathological changes in the heart were noted.

Arterial damage and thrombosis were seen in the liver, intestine, mesentery, and, with infarction, in the spleen and kidney of only one animal (D 3). We were surprised to find no damage in any of the lung sections, even though the concentration of acetylcholine was, naturally, greater there than elsewhere.

DISCUSSION

The coronary vessels are believed to have a very extensive nerve supply. Woollard (1926) showed that the larger coronary vessels are supplied by both vagal and sympathetic fibres, but that this dual innervation does not extend to the medium or small-sized vessels, which are supplied solely by the vagus. The fact, as reported by Michaelow (1908), that there is such an extensive distribution of nerve fibres in the arterial walls, particularly in the medial coat, is of importance in considering our results. He describes an outer plexus in the adventitia and a deeper plexus lying between media and adventitia. Fibres from this plexus extend into the media proper where the deepest and most extensive plexus lies. This "fibre complex" of the media has been described as a "closed plexus encircling the vessel". The abundant nerve fibres in the tunica media end on the muscle fibres as small knob-like enlargements (Glaser, 1924), and penetrate the individual cells to terminate as fine, delicate mesh-like structures within the cytoplasm (Boeke, 1933). It is not yet agreed that nerve fibres exist in the intimal layer (Kuntz, 1934).

Many investigators have shown by various means that vasoconstriction of the coronary arteries occurs as a result of electrical stimulation of the vagus. Assuming that vagus stimulation is effective partly through the medium of liberated acetylcholine, and mindful of the work of Woollard (1926), Glaser (1924) and Boeke (1933), already mentioned, one could consider that any permanent changes which might be produced by prolonged excitation would be produced in the areas most abundantly supplied by vagus fibres, namely, the medial coat

of the medium and smaller-sized coronary arteries and the actual muscle fibres of myocardium (Banting, Ettinger and Hall, 1935). According to the current theory, the effect on the heart of vagus stimulation is due to the direct action on the cardiac fibres of acetylcholine discharged by the post-ganglionic fibres. Since the work of Dikshit (1934), Feldberg and Gaddum (1934), and Barsoum, Gaddum and Khayyal (1934), it is now recognized that acetylcholine is liberated at nerve synapses. Armstrong (1935), using non-innervated Fundulus hearts, suggested that the vagomimetic substance recovered from heart muscle following vagus stimulation was released only at the synapses, and produced its effect only by stimulating directly the post-ganglionic fibres.

Acetylcholine, in the amounts injected in our experiments, is rapidly hydrolyzed in the blood by its esterase as it passes from the leg-veins to the heart. The concentration of the acetylcholine in the heart or arterial blood at any one time, although small, was sufficient to produce flushing, a fall in blood-pressure, tachycardia, excessive salivation, increased peristalsis with borborygmus and diarrhœa, and an effect upon the gastro-intestinal vessels sufficient to cause hæmatemesis and melæna. These effects are not due to an alteration in the esterase system, for repeated injections of acetylcholine do not alter the activity or concentration of esterase in the blood of the dog (Lucas, Hall and Ettinger, 1935).

Clinical evidence of progressive myocardial failure with subsequent death was noted in every animal, and pathological examination showed permanent damage to the heart in all but two animals (young). This is in accord with the accepted view that the heart in myocardial failure does not always show pathological changes. As Clawson (1924) states: "Approximately half of the cases of myocardial failure show no anatomical changes in the heart muscle. The anatomical changes in the heart muscle are seldom sufficient in themselves to cause death". Paul White (1934) endorses such statements.

In those animals which at autopsy showed permanent damage to the heart, which might represent a toxic effect, there was, in the coronary arteries a hyaline degeneration of the tunica media and a tendency to thrombosis. In the myocardium there was patchy hyaline degeneration or infarction followed by extensive hyaline degeneration, with a fibrotic response.

One of the interesting observations made was that in the group of four young dogs severe gastro-intestinal symptoms developed — retching, vomiting, diarrhœa and melæna. Hæmatemesis was also observed in two of the younger dogs. At autopsy very severe congestion of the mucosa of stomach and duodenum, with blood-stained contents, was found.

In the group of old dogs no diarrhœa, no melæna or hæmatemesis was produced, and at autopsy very little congestion of the mucosa was evident.

This brings up the question of the susceptibility of the gastro-intestinal tract to parasympathetic hyperactivity and its related symptom-complex in adults, younger than those who are susceptible to the cardiac symptom-complex, as evidenced in the group of older dogs who developed more severe and earlier cardiac symptoms but failed to develop gastro-intestinal changes.

SUMMARY

Clinical degradation, with severe myocardial and coronary artery damage, was produced by the repeated injections of an abundance of a substance formed in the body and believed to be necessary for autonomic activity, and the damage was found in those areas most richly supplied by vagal post-ganglionic fibres.

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SUBTEMPORAL AND SUBOCCIPITAL MYOPLASTIC CRANIOTOMY*

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IN no branch of surgery is the manœuvre of opening and closing the wound more important or more arduous than in cranial surgery. We desire to describe a simple operative technique which in our hands has proved to be superior to the conventional subtemporal and suboccipital procedures.

MYOPLASTIC SUBTEMPORAL CRANIOTOMY

The myoplastic subtemporal craniotomy technique permits rapid exploration through a wide unobstructed opening and provides a firm safe restoration. The steps of the procedure follow in detail.

1. A curved incision, as indicated in the insert of Fig. 1, is made in the scalp without wounding the pericranium. This incision skirts the superior temporal line, to which the fascia of the temporal muscle is attached. This ends anteriorly at or just behind the hair line. Posteriorly the incision is swung slightly forward on the supramastoid crest, which lies at the level of the superior border of the zygoma. The superior temporal line is identified anteriorly by palpation. It is a direct continuation of the prominent temporal ridge of the frontal bone. As this incision is deepened the pericranium is exposed just beyond the temporal muscle fascia. The incision so outlined is within the hair line; it permits maximum exposure and no incision is made in the temporal muscle. By palpation the extent of the temporal muscle fan can be outlined quickly by having the patient bite.

2. The scalp flap is reflected from the pericranium until the temporal fascia attached to the superior temporal line of the parietal bone and the posterior part of the temporal ridge of the frontal bone is exposed. An incision is carried down to the calvarium through the line of fascial attachment, and the muscle and scalp flap are reflected from the temporal bone and retracted with two or three guy sutures attached to rubber bands (Fig. 1).

3. The bone is removed from the temporal fossa up to within a centimetre or less below the fascial incision. An opening of 9 by 7 centimetres is thus readily obtained which will still permit satisfactory repair (Fig. 1).

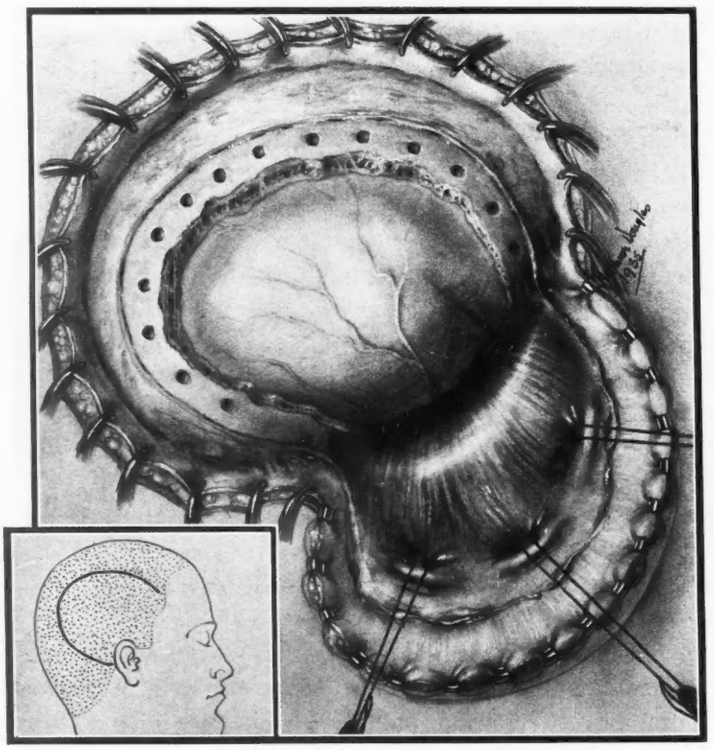

Fig. 1.—The scalp incision is outlined in the insert. The dura has not been opened, but the location of the Sylvian fissure is evident. On the flap side, hæmostasis has been obtained by Michel clips. The flap is retracted by guy sutures attached to rubber bands.

4. To re-attach the myoplastic flap, holes are made in the margins of the bone defect, usually twelve to fourteen in number, and interrupted

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A paper read in the Section of Mental and Nervous Diseases at the Combined Annual Meeting of the American and Canadian Medical Associations, Atlantic City, June 14, 1935.

chromium steel wire* sutures, size 33, are passed through the holes and up through the muscle and overlying fascia and tied next the bone (Fig. 2).

5. The fringe of fascia and pericranium left attached to the flap as it was reflected is sutured with either interrupted silk sutures or with a continuous locked silk suture and the scalp is closed in two layers as usual (Fig. 2).

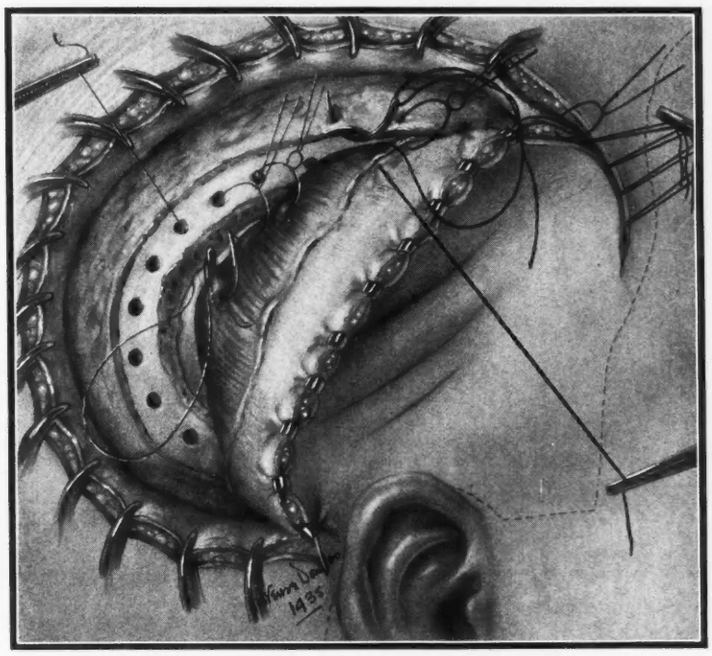

Fig. 2.—The closure is in four layers. Chromium steel wire is used to attach the muscle to the bone. Silk sutures, either interrupted or continuous, are used to close the pericranium. The galea is closed with either continuous locked silk sutures or with interrupted silk sutures. The skin is closed with dermal suture taken continuously and locked.

Comment.—We have found that this procedure gives a considerably wider exposure of brain than the muscle-splitting operation (Fig. 3). It is entirely adequate for the unobstructed removal of temporal lobe tumours or for exploration in a case of bleeding meningeal artery and it is possible to leave a large decompression when indicated. It has been our custom to close the upper portion of the dura so as to hide the fissure of Sylvius, allowing only the temporal lobe to protrude against the muscle when a decompression is to be left on the dominant side in order to avoid herniation of the speech area. It is obvious that when wide exposure is unnecessary the incision and bone opening may be modified as desired.

* Babcock's chromium steel wire (*J. Am. M. Ass.*, 1934, **102:** 1756) is superior to silver wire, catgut or silk for this purpose, and when buried in muscle seems, according to our preliminary histological studies, to give rise to less reaction than any other material. When silk is used for these bone sutures a good deal of foreign body reaction results, very much more than when silk is buried in soft tissue.

MYOPLASTIC SUBOCCIPITAL CRANIOTOMY

This procedure may be used for either a bilateral or unilateral exploration of the posterior fossa. It has been our custom to reflect the flap from the entire occipital bone in most instances, even though the bone opening is to be unilateral. In the bilateral exposure of the bone no incision in muscles is required, and should it become necessary during a unilateral exploration to extend the bone removal to the other side it can be quickly done.

1. The incision (Fig. 4a) extends from the level of the tip of the mastoid process to a point from 4 to 5 centimetres above the external occipital protuberance. The lateral wings of the incision are so placed that the neck muscles attached to the mastoid will not be cut, the incision coming down through the occipitalis muscle directly to the pericranium of the mastoid bone. The point at which the lateral incision is to be made may be determined usually by palpation of the mastoid area. In Fig. 4b it is 2.5 centimetres from the point at which the lobe of the ear is attached to the scalp. Palpation had demonstrated that the neck muscle attachment was mesial to the incision site. In some instances it is necessary to swing the incision even farther laterally, to avoid the neck muscles.

The scalp incision (Fig. 5) includes the galea but not the pericranium. The upper concave edge of the incision may be separated from the pericranium in an upward direction to allow the burr holes to be made for ventricular puncture.

2. The scalp flap is reflected downward as far as the external occipital protuberance. The pericranium is then incised, and while the flap is being retracted the suboccipital muscles are elevated from the bone down to the foramen magnum. The fact that the lateral margins of the incision are carried to the tips of the mastoid processes permits the reflection of the flap so

that it is easily possible to expose the spines and laminæ of the two upper cervical vertebræ. The whole flap is held out of the way with guy sutures attached to rubber bands.

3. The bone removal is carried down to the foramen magnum and upward so as to expose the transverse sinus as desired. The entire sinus may thus be exposed and satisfactory restoration can still be obtained. Indeed, the bone removal has been frequently carried high enough to permit ligation of the sinus, section of the tentorium, and elevation of the occipital lobe, a manœuvre which has been most effective in the hands of Dr. Max Peet.

4. At closure (Fig. 6) in order to re-attach the reflected myoplastic flap from fourteen to sixteen holes are made in the margin of the bone defect about one centimetre apart. The point at which the muscle layer begins on the ventral surface of the flap is, of course, obvious. Babcock's rustless steel sutures are passed through the holes, through the muscle and its aponeurosis, and then tied next to the bone. The fringe of pericranium left attached to the flap is then sutured and the scalp closed in two layers as usual. Except for the steel wire used to attach the muscles to the bone, silk is used for the buried sutures.

When drainage is instituted rubber dam tubing of small size is carried out through a separate stab wound at some distance above the incision. The long tract makes it possible to stop cerebrospinal fluid drainage at once by pressure when the drain is removed.

Fig. 3.—Post-operative x-ray to show a subtemporal opening in the skull through which a large infiltrating glioma of the island of Reil was removed. The holes and steel wire sutures by which the muscle was reattached to the skull are at the margin of the bone defect.

Comment.—The incision can be so planned that no muscle is incised, which procedure lessens the amount of bleeding. The only vessels cut across in this myoplastic type of exposure are those in the scalp and the usual emissary cranial veins always opened by any bone exposure in this region. The restoration of muscles made possible by this method is so firm that elaborate im-

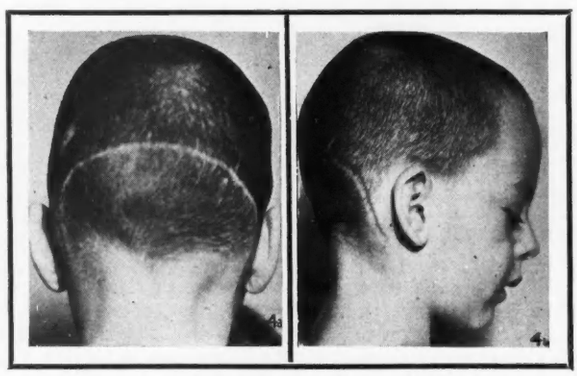

Fig. 4 (a).—Photograph of a suboccipital wound eight days after operation to show outline of incision and satisfactory anatomical restoration. (b) Lateral view to show position of incision over the mastoid process.

mobilizing dressings are unnecessary. This compact closure of muscle to bone and suture of the pericranium prevents troublesome post-operative accumulation of fluid.

We have had various opportunities to study the myoplastic suboccipital restorations at second operations and at autopsy. In every instance the plastic result was entirely satisfactory from all standpoints. Two cases may be described. In the first the myoplastic suboccipital procedure was used to carry out a cerebellar exposure. No tumour was found and the dura was left open for decompression. Following operation headache and vomiting ceased and papillœdema subsided. Signs recurred and the decompression became very tense, but could not bulge. A second suboccipital exposure was easily accomplished six months after the first through an anatomically perfect repair. The tumour arising from the pineal gland and projecting beneath the tentorium was verified but not removed. The sequence of events is given in this detail to show how effectively the plastic repair at the first operation withstood the increased pressure caused by a blocked ventricular system, and to show that re-opening of the wound was not difficult.

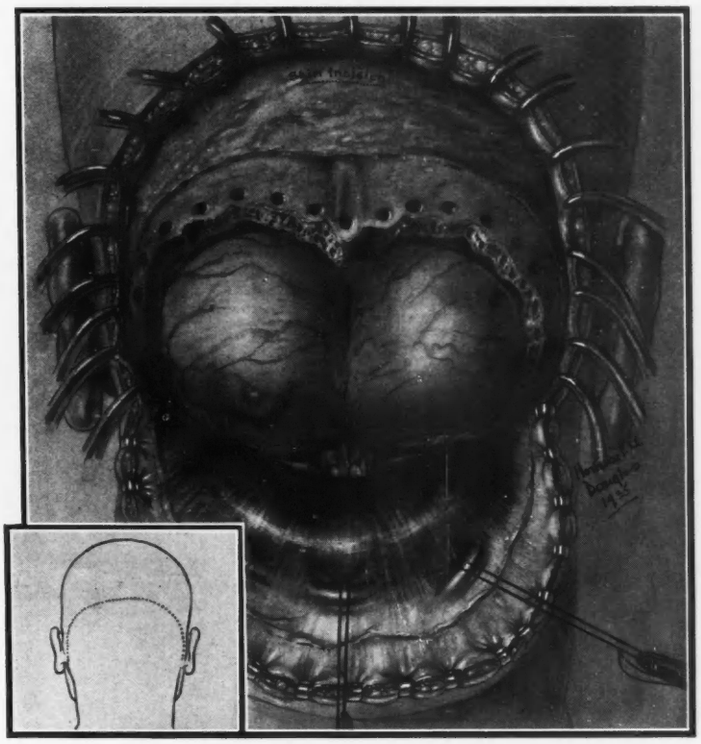

Fig. 5.—The suboccipital exposure with insert to show incision. The posterior arch of the foramen magnum is removed and the arch of the atlas has been taken away. No incision has been made through muscle. The muscle is left entirely attached to the overlying scalp. The lateral sinus exposure may be even more extensive than is shown and still permit safe restoration.

In the second case a fifty-seven day old plastic repair was studied at autopsy. The patient (who was also suffering from essential hypertension) had had a left acoustic perineurial fibroblastoma removed. The operative wound healed well and the patient left the hospital on the seventeenth day. Unfortunately, however, she died forty days later from an overwhelming cerebral hæmorrhage. Fig. 7 is a photograph of the specimen removed at autopsy and shows the occipital bone above and the diaphragm of re-attached muscle and fascia below. On the right the tissue has been scraped off to show the drill holes. In this patient, chromic catgut suture had been used to attach the muscles to the calvarium through the multiple drill holes. The sutures themselves were completely absorbed. The drill holes were filled with firm cylinders of connective tissue, binding the flap to the bone, and the muscle was bound to the bone edges around the bone defect, giving a permanently strong re-attachment. Wider exposure, less hæmorrhage during opening, and greater strength of restoration are possible with this technique as compared with other operative manœuvres. The bone open-

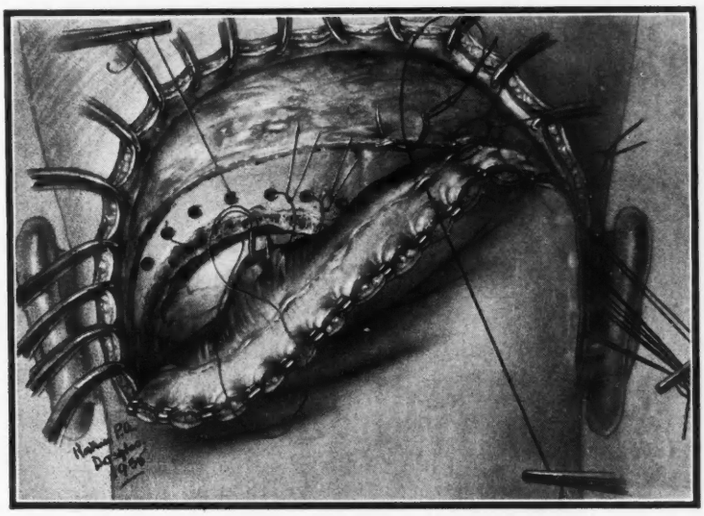

Fig. 6.—As in the subtemporal technique, the closure is a four-layered one, *i.e.*, muscle to bone, pericranium, galea and skin.

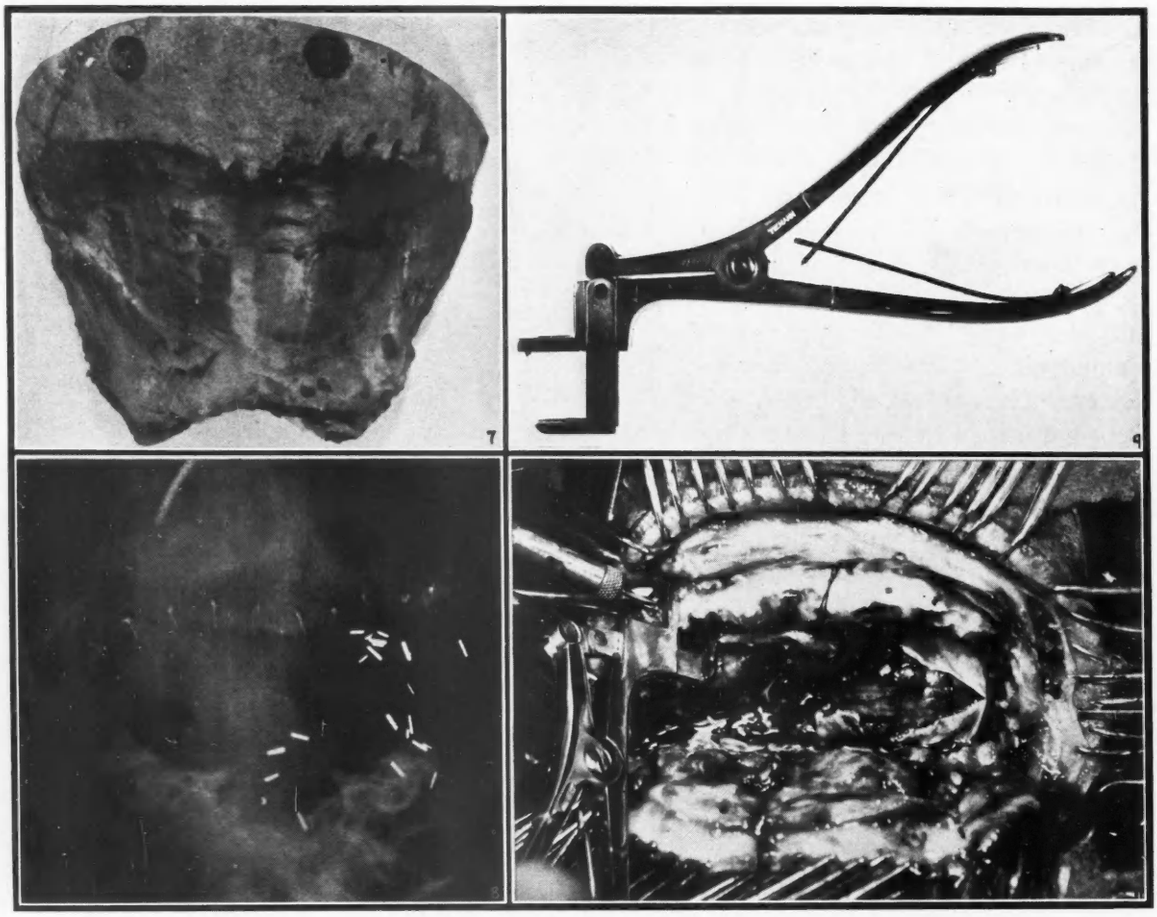

Fig. 7.—Specimen obtained at autopsy through the courtesy of Dr. William Chase, Department of Pathology, McGill University, fifty-seven days after myoplastic suboccipital craniotomy. Bone exposed above and muscle and fascial diaphragm below. The anatomically perfect repair is evident. The burr hole openings were made at the time of the procedure, so that the ventricles could be tapped to reduce the pressure. **Fig. 8.**—Roentgenogram, to show the bone opening in the patient photographed in Fig. 4 (a) and (b). The wide bone removal, the removal of the posterior arch of the foramen magnum and the arch of the atlas, is obvious. **Fig. 9.**—Barton's drill-guide* (made by Tiemann). **Fig. 10.**—The drill-guide in use during closure of a suboccipital myoplastic craniotomy.

ing which may be obtained is indicated by x-ray in Fig. 8.

General Discussion

It has been a matter of common experience, since Cushing[1] described the intermuscular subtemporal and the crossbow suboccipital decompressive operations, that cranial defects beneath the temporal and suboccipital muscles cause no special disability. The brain covered by muscle is adequately protected from ordinary trauma, and the patients with such openings rarely complain of subjective symptoms.

The technique of Cushing has been accepted in practically all neurosurgical clinics on this continent and abroad without significant alteration. Wound healing has been good and the plastic results satisfactory. In the temporal region, however, exposure is inadequate for anything but a simple decompression. It is necessary with the muscle-splitting incision to work beneath the covering of muscle which often cannot be adequately retracted without tearing it from its attachment. In his occipital procedure the steps of exposure are time-consuming and hæmorrhage is troublesome. The muscle fringe left attached to the nuchal ridge to permit of plastic repair interferes with exposure. Closure is furthermore a laborious procedure.

We had followed Cushing's technique for sub-

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* We are greatly indebted to Dr. Lyman G. Barton, of Plattsburgh, N.Y., who designed for us the useful instrument shown in Fig. 9. This drill-guide makes it possible to cut very quickly the small holes through which the sutures to the muscle are passed. The drill point is prevented from wandering when the hole is being started by a slot in the upper foot. The drill point is stopped after passing through the skull by the under foot which it cannot miss. Fig. 10 shows the instrument in use during the suboccipital procedure.

temporal and suboccipital craniotomies habitually until two years ago when we began to use the myoplastic procedures we have described. Wider exposure has been possible. Wound healing has been unusually satisfactory. This is due to the fact that less dissection is required and there is less interference with the vascular supply of the flap, since the relationship of muscle to the scalp is not disturbed. Entirely satisfactory plastic repairs have been obtained. The attachment of the muscles is so firm that even though intracranial pressure remains high no unsightly hernia can develop. The powerful neck muscles are as firmly attached as the temporal fan. The facility of execution both in opening and closing the wound has shortened the operative time considerably.

REFERENCE

1. CUSHING, H.: The establishment of cerebral hernia as a decompressive measure for inaccessible brain tumours; with the description of intermuscular methods of making the bone defect in the temporal and occipital regions, *Surg., Gyn. & Obst.*, 1905, 1: 297.

THE EMBRYOLOGICAL AND CLINICAL ASPECT OF DOUBLE URETER*

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THE anomaly of duplication of the ureter and pelvis has been recognized for many years. At first it was an anatomical curiosity found at autopsy or at operation; later it was diagnosed clinically on rare occasions, until now we realize that this anomaly is one of the most common of all urinary malformations and the etiological factor in many renal lesions.

Double ureters have been classified as: (1) Complete, wherein two pelves on the same side, one superior to the other, drain by separate ureters and open by separate orifices on to the floor of the bladder. The openings may lie side by side or one may be superior to the other. They may also be closely situated or set at some distance apart. (2) Incomplete, wherein two pelves and two upper ureters join to enter the bladder by one common ureter and orifice. Both of these forms of duplication may be unilateral or bilateral. The bifurcation in this latter group may be situated at any point in the course of the ureter, from just above the bladder, up to the renal pelvis. Minor degrees of bifurcation are commonly referred to as bifid pelves.

To understand the variations of ureteral duplication we have to refer to the development of the urinary system. The adult kidney and its ducts are preceded in their development by two temporary secretory organs. These to a great extent degenerate, portions of them, and only in the male, being retained as the excretory ducts of the genital system. The first of these transient kidneys, the pronephros, is a series of paired segmented tubules arising from the mesoderm of the intermediate cell mass or nephrogenic cord. These tubules run from the seventh to the fourteenth segments and are joined together by a solid cord, which, becoming canalized, continues downward past the fourteenth segment, fuses with the dorso-lateral wall of the cloaca, and penetrates it to form the pronephric duct. These pronephric tubules almost immediately degenerate, but the duct persists and is utilized as the excretory duct of the mesonephros, the second of the temporary kidneys.

The mesonephros or Wolffian body consists of a larger number of non-segmented tubules and extends from the sixth cervical to the third lumbar segment. The superior tubules degenerate rapidly, and it is probable that never more than thirty of these tubules are fully developed at any one time. These tubules arise as solid nests of cells from the nephrogenic cord, become hollowed out and elongated transversely, fuse at their lateral end, and open into the existing pronephric duct. In the lower end of this duct, now called the mesonephric or Wolffian duct, there appears about the fifth week an epithelial bud. This bud arises from the dorsal wall at

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a point just where the duct turns anteriorly to pierce the cloaca. It grows upward and backward as a hollow tube. The distal extremity dilates into the primary renal pelvis and is surrounded by mesenchymal cells from the lower end of the nephrogenic cord. The primary renal pelvis on reaching this point divides into superior and inferior pole tubules. Two additional primary tubules grow out laterally between these two. The nephrogenic cells also divide to surround each tubule like a cap. From this first subdivision are formed the major calyces. Division of these primary calyces forms the minor calyces. The third and fourth divisions provide for enlargement of the calyces, and subsequent divisions provide for the collecting ducts and tubules. The nephrogenic cells in the meantime have divided in keeping with the divisions of the pelvis and surround each divided branch —ultimately forming a vesicle which unites with the collecting tubule to form the uriniferous tubule.

During this time marked changes are taking place in the cloaca. In the V-shaped area between the hind-gut and the allantois a wedge of tissue, the urorectal septum, has been growing downward. This meets the cloacal membrane, dividing the cloaca into the rectum and the urogenital sinus, and leaving the openings of the Wolffian ducts on the ventral side. Openings appear in this cloacal membrane, the anal canal and the urogenital sinus.

From the upper half of this primitive urogenital sinus the adult bladder is developed. The lower portion remaining as the prostatic urethra in the male and the whole urethra and vestibule in the female. By reason of the bladder's rapid growth, the lower ends of the Wolffian ducts are taken up in its growth, thus bringing the ureteral openings down on to the bladder floor. The Wolffian ducts and ureteral orifices gradually become separated. As the greater growth of the bladder occurs in its upper half, the ureteral orifices, being superior in position, are soon carried upwards and laterally leaving the Wolffian ducts in the lower narrow portion, to become the ejaculatory ducts in the prostatic urethra. In the female the lower narrow portion of the bladder becomes the urethra and vestibule of the vulva, the orifices of the Wolffian ducts are then obliterated.

The development of the two types of double ureter has been shown to arise from two different anomalous processes. The incomplete or

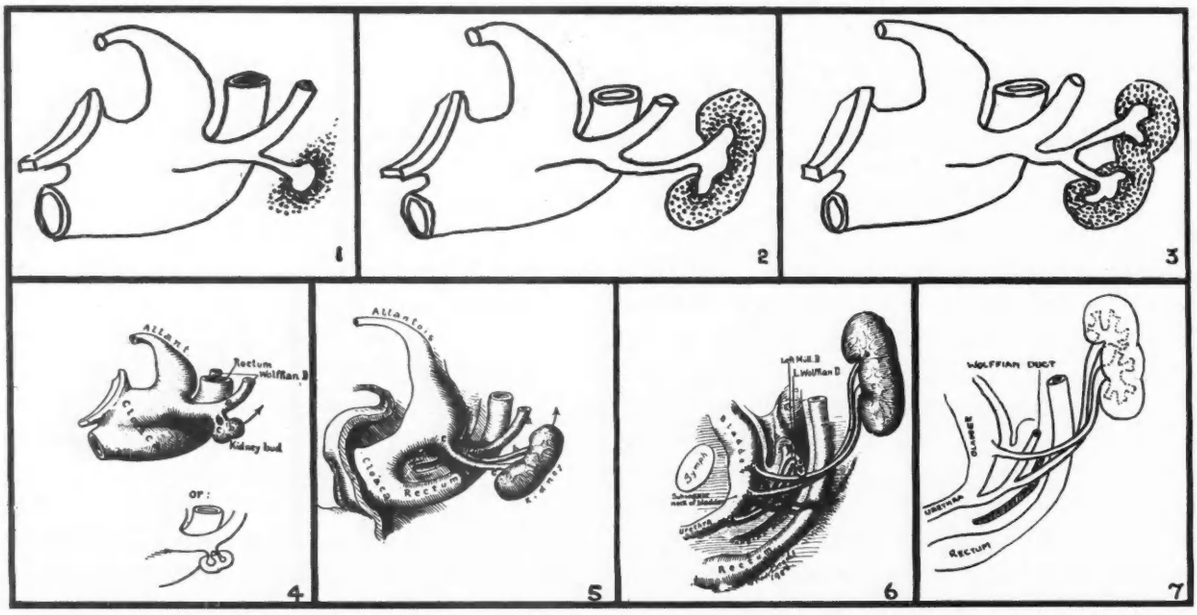

Fig. 1.—Ureter budding from lower end of Wolffian duct. Terminal dilatation surrounded by cells from lower end of nephrogenic cord. **Fig. 2.**—Subdivision of primary pelvis into major calyces. Each division surmounted by nephrogenic cells. **Fig. 3.**—Early branching of ureteral bud with formation of incomplete double ureter and pelvis. **Fig. 4.**—Formation of twin buds in lower end of Wolffian duct. Two separate ureters and pelves—each capped by nephrogenic cells. (Brodel). **Fig. 5.**—Drawing down of lower ureter to bladder floor, in expansion of the end of the Wolffian duct to form the trigone. (Brodel). **Fig. 6.**—Orifice of the lower ureter is drawn upwards and laterally due to the growth in the upper half of the primitive bladder. Orifice of the upper ureter reaches bladder at later period and is lower in position on the trigone. Wolffian ducts remaining in the lower half of the original urogenital sinus, become the ejaculatory ducts in the posterior urethra. (Brodel). **Fig. 7.**—High origin of the upper ureter bud causes failure to reach the bladder floor. The ureter to the upper pelvis then opens into the Wolffian duct.

branched ureter has been shown by Pohlman[6] to be due to a splitting of the ureteral bud as, or after, it arises from the Wolffian duct. The ureteral bud normally divides to form the superior and inferior major calyces after the primitive renal pelvis has grown into the lower end of the nephrogenic cord. Thus a premature splitting before it reaches the nephrogenic cells gives rise to the incomplete or branched ureter. Each division of the ureter takes place at any point between the ureteral bud and the renal pelvis, the commonest site, according to Braasch,[1] being in the upper third of the ureter. Cases have been reported where the main ureter branched into three, four and even five divisions. These are really elongated calyces, without the formation of a true pelvis. Kretschmer[4] and others have reported cases where one branch of a bifid ureter ended blindly —evidently a lack of development of the nephrogenic cells forming the cap about its terminal dilatation, or a failure of the ureter branch to meet these cells. This condition has been also thought by some to be a congenital diverticulum of the ureter.

Complete duplication has been thought to be due to a similar very early splitting of the ureteral bud, the twin ureters being so closely placed that, by the expansion of the lower end of the Wolffian duct, they would be drawn on to the bladder floor as separate openings. Chwalla[3] on the other hand has shown that they are most probably due to the formation of twin ureteral buds, arising one above the other on the lower end of the Wolffian duct. These twin ureters then grow upward and laterally, as does the single ureter, and meet the nephrogenic cells in the upper sacral region, forming separate renal pelves. The upper pelvis as a rule is the smaller of the two. Upon the distance separating the pelves depends whether the two halves of the kidney are entirely separate, fused by connective tissue bands or one solid mass of secreting kidney tissue. Upon the distance separating the two pelves also depends the blood supply, whether it is supplied by one main renal artery, a branched vessel, or separate renal arteries from the aorta.

Changes, due to the growth of the bladder, occur in the lower ends of the ureters. In the drawing out of the lower ends of the Wolffian ducts on to the bladder floor to form the trigone the lower bud, that to the lower pelvis reaches the bladder first, and in the bladder's rapid growth is drawn cranially and laterally away from the openings of the Wolffian ducts. The ureter to the superior pelvis being drawn down at a later period, its orifice is in a lower and more medial position. This as a rule produces a crossing of the ureters, usually just above their insertion into the bladder wall. Additional crossings may or may not occur, as the lower ureter is more redundant, due to the rotation of the lower pole of the kidney through an angle of 45° to reach the normal upright position.

Low implantation of the ureter to the upper pelvis at or near the vesical neck is due to the distance separating the two ureteral buds. A high origin of the upper bud will retard its arrival on the bladder floor, so that it will open nearer or even outside of the vesical neck in the posterior urethra. Similarly, ectopic openings of the ureter depend upon the same high origin of the upper bud. Their high position precludes an opening on to the bladder floor, and they retain their opening in the Wolffian duct. In the male this brings about the anomaly of the ureter to the upper pelvis opening into the vas deferens, either above the seminal vesicle, or below it, in the ejaculatory ducts. In the female a high point of origin of the upper ureter bud permits of the implantation of its orifice at any point in the shorter urethra. As the vestibule arises from the lower half of the urogenital sinus it may also be implanted on its surface. If the upper ureter retains its opening in the Wolffian duct in the female, it will remain attached to a duct which normally should degenerate and whose opening should disappear from the floor of the urogenital sinus. In this case there are, I think, three possibilities. If the Wolffian duct degenerates the ureter will end in a blind cyst at some point between the urethra and the vagina; if it persists, the ureter will open at the vestibular margin of the upper part of the hymen; or if the Wolffian duct fuses with and opens into the lower end of the downgrowth from the Müllerian duct it will open into the vagina.

Anomalies of these three types have been frequently reported. Spitzer and Wallin[7] believe that the supernumerary ureter opening on to

the vestibule or into the vagina is due to persistence of the Wolffian duct, the secretory tissue found about its terminal dilatation being persistent mesonephric tubules. This theory, in the male, would necessitate a longitudinal splitting of the Wolffian duct with the formation of an additional tube and the persistence of tubules not otherwise retained in the formation of the epididymis. In the female one would expect the persistent mesonephric tubules to be situated in the broad ligament and not superior to the permanent kidney or metanephros.

From a clinical point of view, the anomaly of double ureter and pelvis is extremely important. It is a well recognized rule that an abnormal organ is more liable to disease than a normal one, so that the possibility of this duplication must be kept in mind in investigating all renal lesions.

Over a period of seventeen years in the Royal Victoria Hospital we have diagnosed 63 duplications of the pelvis and ureter. Of this number 23 were complete and 3 bilateral. The remaining 40 were incomplete or branched in type, 2 of them being bilateral. Of the total number only 11 or 17.5 per cent were discovered accidentally and were free from other disease. The remaining 52 were involved in an associated renal lesion. The lesions most frequently found were hydronephrosis or hydroureter, and infection, either alone or in combination.

There are, of course, in this condition of double ureter no symptoms *per se*, any symptom present being due to an associated lesion. Therefore the original finding of this condition was from autopsy material or at the operating table. With the invention of the cystoscope complete duplications were found by the presence of additional ureteral orifices in the bladder. This is still the simplest method of diagnosis, but occasionally an additional orifice is overlooked especially in the presence of marked inflammation, blood clot, diverticulum or an enlarged prostate. In this instance the pyelogram will aid, for the finding of a small or hypoplastic renal pelvis confined to one pole of the kidney will send us in search of the pelvis in the remaining segment. With the general use of pyelographic media it became possible to diagnose the incomplete or branched type of double ureter and pelvis. It has been shown by many previous writers that the most important procedure in the making of pyelograms is to withdraw the catheter well below the renal pelvis and to inject an additional amount of solution so that any branching ureter and pelvis may also be filled. In this connection it may be necessary to plug the ureteral orifice with a Garceau catheter so that the solution will enter the narrow or constricted branch, especially if it branches near the ureteral orifice. This procedure is borne out by our own figures, for in the first twelve years, out of 27 cases, only 11 branched ureters were found; while in the last five years, 29 were diagnosed. Undoubtedly the diagnosis has been much simplified in the last few years by the additional use of excretion pyelography.

In the condition of an ectopic supernumerary ureter the diagnosis, at least in the female, is often suggested from the history. In these cases, with an ectopic ureter opening into the urethra vestibule or vagina, the history of incontinence from birth accompanying an otherwise normal urination should provoke an earnest search for an additional orifice in one of these locations. In certain cases incontinence is not a feature, as in Bruce's[2] and Muschat's[5] recently reported cases. In one an infected hydroureter set in force symptoms resembling a pelvic peritonitis, and in the other the cystic dilatation of the termination of the ureter in the urethra caused partial retention and urosepsis.

Excretion pyelography may or may not be of use in these cases, as the upper or diseased segment may not excrete sufficient of the iodine solution to cast a shadow. Similarly intravenous indigo-carmine can be used in an attempt to find an additional orifice. This may fail, due to the same lack of secretion, and also because the supernumerary ureter is frequently obstructed, with a marked slowing in the rate of excretion. If an ectopic opening be found it can usually be catheterized for a sufficient distance to inject an iodide solution or even to collect a specimen for examination. The uretero-pyelogram in these cases is typical—a tortuous and dilated lower ureter rising to the superior pole of the kidney and surmounted by a normal or dilated hypoplastic renal pelvis. In the male an ectopic ureteral opening is more difficult to diagnose, and then only when the symptoms of infection, hydronephrosis, hæmaturia or calculus cannot be satisfactorily explained following the usual routine examination. Here, with careful search of the posterior urethra coupled with the

use of indigo-carmine intravenously, the ectopic ureteral orifice may be found. Excretion pyelography may show the additional superior pelvis. At times the diagnosis may be suggested by the small pelvis found in the lower pole of the kidney shadow, even before the ectopic ureter is searched for.

The anatomical variations of the anomaly are many. The kidney may be of normal size and conformation or even slightly larger. The surface may be uniform or show a definite furrow or constriction at the junction of the two segments. This fusion may be complete or simply fibrous in nature, or the two segments may be entirely separate. The superior portion then occupies the normal position with the inferior one at some lower level.

The blood supply to the two segments, according to corrosion specimens, is entirely separate, although only one main vessel may enter the kidney substance. If the distance separating the two pelves is increased the blood vessels are more apt to branch before entering the kidney. At times individual arteries to each segment arise from the aorta. The renal pelves are situated one superior to the other; the upper pelvis or, as it is sometimes called, the supernumerary or hypoplastic pelvis is as a rule smaller in size, with fewer major and minor calyces. Even though it is smaller and apparently drains less kidney substance, Braasch states that the function of the two segments is equal. The ureter varies of course as to whether it is complete or an incomplete duplication. If complete, the ureter to the upper pelvis is as a rule straighter in course and somewhat narrower than its mate, which is usually wider and more liable to redundancy. They may cross one or more times or may lie side by side. Although usually having separate sheaths they may be enclosed partially or completely in a common sheath.

The situation of their orifices in the bladder varies. They lie on or at the side of the ureteral ridge, the orifice of the ureter to the lower pelvis being superior or lateral, while that of the upper pelvis is medial and inferior. It is this latter orifice which is frequently displaced, either in a lower position on the trigone or near the vesical neck, or in some abnormal position, such as the urethra or vas deferens in the male or the urethra vestibule or vagina in the female. The incomplete or cleft ureters vary according to the region in which they divide, the commonest site being in the upper third. The branches may be of the same calibre, or one of them may be larger than the other. Their openings into the main ureter may be free, although constriction of the opening of one branch is a frequent occurrence. Hydroureter and hydronephrosis are common sequelæ. The ureteral orifice of a bifid ureter differs in no respect from the normal.

Triplication of the ureter has been reported as well as division of the main ureter into three, four and even five upper branches, the pelves in these cases being really the major calyces. Double ureters both complete and incomplete are frequently found in cases of fused or horseshoe kidney.

From a pathological point of view, any lesion which may be found in a normally developed kidney can, of course, be found in an anomalous double kidney. In 52 of our 63 double ureters some pathological lesion was present. The two predominating lesions were obstruction, with resultant hydroureter and hydronephrosis, and infection. Evidence of hydronephrosis was present in 48 of these pelves and ureters and 50 of the 52 showed evidences of infection. In the majority of cases the lesion was one of infected hydronephrosis.

Of the 52 cases only 13 were treated by operative measures, and these all belonged to the group of incomplete bifurcations. Seven involved nephrectomies for pyonephrosis; in 6 of these the lesion involved both pelves. One involved only the lower pelvis, but the danger of microscopic invasion of the upper segment with consequent secondary nephrectomy, prevented us from attempting a partial resection. One nephrectomy was for a left renal tuberculosis; the upper pelvis was free from apparent infection but on microscopic section tubercles were found in the parenchyma of the upper segment. One hydronephrosis of the lower segment with nephroptosis was treated by freeing adhesions about the point of bifurcation of the ureters, followed by nephropexy. There were two nephrectomies for calculous pyonephrosis and two pyelotomies for calculus in the lower pelves. Ureteral calculi were present in 6 cases, 3 in the complete double ureters and 3 in the incomplete, all of which were passed either before or following ureteral dilatation.

Hemi-nephrectomy was not performed on any

of these cases, although many successful operations have been recorded by others over a period of years. In our opinion the extent of parenchymal invasion is difficult to ascertain grossly, the urine examination from the apparently normal pelvis often misleading, especially in cases of the incomplete or branched type. It is granted that the operation of hemi-nephrectomy is ideal for the purpose of conserving kidney tissue in the presence of some lesion in the opposite kidney. In our operative series, 6 cases involved the right kidney and 7 the left. Three were in males and ten in females. The incomplete bifurcations in the upper third were twice as many as the branchings in the middle and lower thirds. In the whole series we have found the lower pelvis more than twice as often involved in some lesion than the upper. On the other hand, we have had no supernumerary ureters with an ectopic opening. It is a recognized fact that in these cases it is the upper pelvis that is the seat of infection and hydronephrosis.

In the small series reported we naturally cannot offer figures of statistical value, many well recognized lesions not being encountered.

In concluding, we may say that the treatment as far as the double ureter is concerned is really the treatment of the accompanying surgical lesion. For the ectopic supernumerary ureter, complete or partial ureterectomy with nephrectomy or hemi-nephrectomy as the conditions indicate.

I wish to extend my thanks to Dr. David W. MacKenzie for his permission to report these cases, and to Mrs. H. H. Cheney for her excellent illustrations.

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FURTHER HISTORY OF THE CARE AND FEEDING OF THE DIONNE QUINTUPLETS*

BY ALLAN ROY DAFOE, O.B.E., M.D.,

Callander, Ont.

THE details of the birth of these infants and their immediate care have already been recorded.† To that report I would like to add some further history of the care and feeding up to the age of ten months.

Shortly after birth, when the babies were breathing and emitting little mewing cries, they were wrapped up in the only coverings available, placed on the bed, and covered with a heated blanket. Soon after this a laundry basket was obtained, and the babies were carefully tucked in this and kept warm by blankets heated in the oven. Later on in the day the nurse brought with her the first hot water bottle we used. On the third day an incubator was presented to us, and the three smallest infants were transferred to this. Within a week, a second incubator was obtained and then, finally, three more were secured, so that a separate one was available for each. The first incubator was made with a hollow frame, a glass hinged top, and fitted with a thermometer and a sponge holder. It was heated with hot water in a copper tank. The other incubators were ingeniously constructed and patterned after an old picture of Tarnier's, as shown in Cook's Obstetrics. The second type of incubators were heated by earthenware containers, which are known in the country as "little pigs". It was necessary at this time to employ an orderly, and his whole time was spent in keeping the fire going in the cook stove, maintaining the proper temperature of the water in the incubator containers, and helping with the washing. The temperature of the incubators was kept between 87 and 90° F. for the first few days, but as time went on this was gradually lowered and maintained at 84° F. The humidity within the incubators was measured and kept between 50 and 55° by the use of sponges soaked in hot water.

* Read before the 4th District of the Ontario Medical Association in annual session, Niagara Falls, October 23, 1935.

† A. R. Dafoe, *J. Am. M. Ass.*, 1934, **103:** 673.

A room next to the mother's bedroom was cleared and made into a nursery. By the end of the fifth day we had three graduate nurses, a cook-general, and an orderly, and for the first time we had a breathing spell. This gave us an opportunity to prepare plans for the protection of the babies and to obtain the necessary equipment for their care.

The babies were born about two months before full term and presented the typical appearance of premature infants, being bluish black in colour, with bulging foreheads, small faces, wrinkled skin and no subcutaneous tissue, enlarged soft "tummies", flaccid muscles, and spider-like limbs. At times the breathing would almost stop, then pick up and race along above the normal rate. For days it seemed impossible that the tiny spark of life in each of their bodies would prove sufficient to produce a continuous functioning of the various systems in the body machine. The babies had to be watched every minute and stimulated frequently, to arouse them out of their attacks of cyanosis and dyspnœa. Within the first week cylinders containing oxygen 95 per cent, carbon dioxide 5 per cent, and fitted with a reducing valve and ordinary inhalator were obtained. This gas mixture replaced all other methods of stimulation. It was a most valuable measure in relieving the attacks of respiratory distress. The inhalators were given as an *apéritif* a few minutes before feeding time in the early days and with every attack of dyspnœa and cyanosis. It was most interesting and very satisfying to watch how the gas would stir up these torpid little babies and produce an energetic sucking from the Breck feeders. We used the gas mixture until the babies were three months old, and altogether depleted 14 cylinders, each one of which contained 80 gallons.

The babies were kept in the incubators until they all reached the weight of six pounds. For the first two months they were removed once a day only, in order that they might be oiled. At the end of this time, the oil bath was changed to a soap and water one. When they were five pounds in weight the incubators were used as cots and the extra heating was stopped.

In the early fall (1934) each baby in turn developed very quickly, a severe type of intestinal toxæmia as shown by high temperature, rapid pulse, abdominal distension and diarrhœa, and they gave me many anxious moments. (An investigation showed that the most probable source of this infection was the diapers, which were improperly sterilized.) The anæmia, which was present before to some extent, became more marked and small doses of ferrous chloride were given three times a day in their feedings. This iron mixture was kept up until they were one year old. At the same time preparations were carried out for possible blood transfusions. The babies' bloods were typed (found to be all Jansky No. I) and prospective donors were found. Hospitals offer a much greater freedom in the matter of transfusions than do country homes, and this home, with its many local and racial prejudices, was no exception to this statement. Fortunately it was not necessary to carry out this procedure.

The opening of the hospital on September 22, 1934, marked one of the most important events in the history of the babies. It gave me the first opportunity for unrestricted medical control (with its various ramifications in this case) in the care of the babies.

Everyone realizes, I am sure, the difficulties that any family would have in adjusting themselves to a situation that the birth and survival of quintuplets produced. The Dionne house was a representative home of the backwoods, and, of course, offered the usual limited facilities of that country. The routine of family life was shattered by the various duties carried out by the three nurses, orderly and cook, which were necessary for the welfare of the babies. It was quite natural, therefore, that the family should find the whole situation very bewildering. Furthermore, we found that proper isolation measures were impossible to carry out in the home, and black flies, mosquitoes and other insect visitors evaded our vigilance. Proper food and rest for the nurses, and protection from the curious public were amongst our other problems. All of these troubles ended, however, when the babies were transferred to their new residence, which is situated about 100 yards across the road from their house of birth. It contains a large, bright, well equipped nursery, four bedrooms, a bath-room, dining room and kitchen. This hospital is supplied with electricity and contains all the conveniences and equipment which is necessary to maintain a modern infants' home. The personnel of the staff remained the same. Dur-

ing the summer just past a considerable number of changes in the building have been made. An isolation ward, an extra bathroom, and a sunroom have been added, and we feel that these additions will increase the efficiency of our care for the children.

After the babies arrived at the hospital they were introduced for the first time in their lives to the northern sun and the invigorating outdoor air. Commencing gradually, they soon began to spend hours under warm wrappings on the veranda, in the fresh air, and this was continued throughout the winter months. They immediately began to show a definite improvement; their faces filled out, their eyes sparkled, their legs became straight and plump, their "tummies" developed good proportions, and these happy little souls soon took on the rotund appearance of little puppies. Their normal development has been continuous ever since, and I know of no greater treat in the world than the one I receive when I enter the quintuplets' nursery every morning and see such a rare collection of smiling healthy babies.

In the country where I live, physicians have a very limited chance to follow carefully the early care of infants. The grandmothers, mothers and midwives carry on with those duties shortly after the babies are born. We are usually only called for serious illnesses. The complete control of the care and feeding of the quintuplets gave to me the greatest pleasure of my life. I have no illusions about any special knowledge that I possess in the practice of pædiatrics, and therefore I have tried to take advantage, to the best of my ability, of the good results obtained in our research centres. I feel, however, that I have learned a great deal in the last year and a half regarding infant care. My education has been further augmented through the medium of an international correspondence course in Medicine, Pædiatrics, Bacteriology, and Therapeutics. My preceptors in this course have been varied, and included Christian Science followers, astrologers, chiropractors, veterinary surgeons, nurses, fathers, mothers, and maiden ladies. Many superstitious beliefs and ancient ideas regarding medicine and disease were passed along to me for my help. Letters containing advice and offers of help were received from Great Britain, India, Germany, France, Central America, Mexico, Australia, Philippine Islands, and from all over North America. I am quite sure that every milk preparation either "in" or "off" the market was mentioned in some of the letters. Goats and prize cows were offered to provide the necessary milk for the babies, and wet nurses made application for dairy appointments. It was suggested that a healthy lactating Yorkshire sow would solve our feeding problems. Her milk could either be obtained by pumping, or else preparing a place in the house whereby the babies could be directly suckled. It was intimated that the sow could be trained to adapt herself to this maternal duty. The reported onset of intestinal toxæmia produced an avalanche of letters, all of which contained suggested measures of treatment. Watermelon juice, infusions of blackberry root, horsetail plant, sassafras and knot weed were said to have produced spectacular results in similar cases. Whiskey was a common ingredient of many suggested remedies, and was to be used both internally and externally. The use of spirits, however, produced several letters of criticism for starting the children at such a tender age on a downward path. Sheep's dung tea, sweetened and warmed, was offered as a cure for "The Blue Spells". Placental blood in warm water was another secret imparted to me, for use in saving the babies. Of course, the usual letters containing messages from the stars, dreams of kidnapping, and warnings against poisoned food were plentiful. A beauty specialist, in her own words, "a rather noted one", advised the use of her marvellous cream to remove the wrinkles from the premature babies. The contents of the morning mail offered great possibilities, and the following are two examples from amongst the interesting communications received:

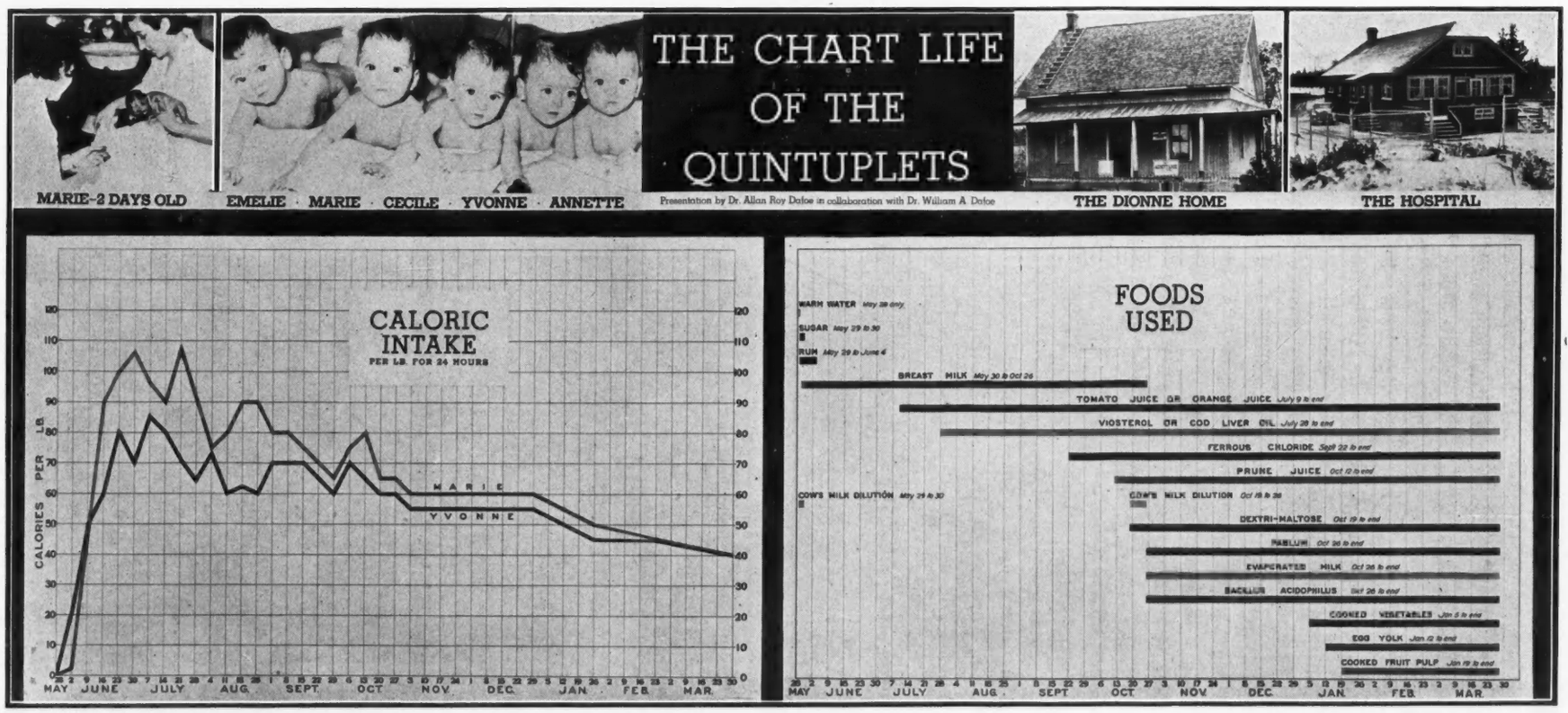
Dear Sir:

I notice by the evening paper that you are waiting on a lady who is mother of 5 girl babies. You sure have your hands full—What carries away babies is Diareh or summer complaint or looseness of the bowels —Now the best cure I know is perfectly harmless.

"Get pure Rye Whiskey and pour one teaspoon into a saucer. Take a clean pine sliver and set it on fire until it goes out. The dose for a medium cized baby (5-6 lbs) would be 1 drop, every 2 hrs. There ain't no poison in pure Rye Whiskey after it is burnt and I am anxious to see you pull through with them all. This is why I am putting you onto this cure.

(Signed) . . . . . .

CHART I.


MARIE-2 DAYS OLD
EMELIE · MARIE · CECILE · YVONNE · ANNETTE
THE CHART LIFE OF THE QUINTUPLETS
Presentation by Dr. Allan Roy Dafoe in collaboration with Dr. William A. Dafoe
THE DIONNE HOME
THE HOSPITAL
CALORIC INTAKE
PER LB. FOR 24 HOURS
CALORIES PER LB.
MARIE
YVONNE
MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR.
FOODS USED
WARM WATER May 29 only
SUGAR May 29 to 30
RUM May 29 to June 6
BREAST MILK May 30 to Oct 26
TOMATO JUICE OR ORANGE JUICE July 9 to end
VIOSTEROL OR COD LIVER OIL July 28 to end
FERROUS CHLORIDE Sept 22 to end
PRUNE JUICE Oct 12 to end
COW'S MILK DILUTION May 29 to 30
COW'S MILK DILUTION Oct 19 to 26
DEXTRI-MALTOSE Oct 19 to end
PABULUM Oct 26 to end
EVAPERATED MILK Oct 26 to end
BACILLUS ACIDOPHILUS Oct 26 to end
COOKED VEGETABLES Jan 5 to end
EGG YOLK Jan 12 to end
COOKED FRUIT PULP Jan 19 to end
MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR.

FEEDING INTERVAL

DATE	AGE	INTERVAL
May 29 to June 22	1 Day to 24 Days	q.2 h.
June 23 to July 13	4 Weeks to 7 Weeks	q.2½ h.
July 14 to Oct. 18	7 Weeks to 21 Weeks	q.3 h.
Oct. 19 to Nov. 2	21 Weeks to 23 Weeks	q.4 h.x6
Nov. 3 to March 8	23 Weeks to 41 Weeks	q.4 h.x5
March 8 to March 28	41 Weeks to 44 Weeks	Q.I.D.

FEEDING APPARATUS

May 29 to June 1	Eye dropper.
June 2 to July 13	Breck feeder.
July 14 to December 21	Feeding bottle.
December 22 to March 28	Fluids by cup, solids by spoon.

GENERAL INFORMATION

DATE	AGE	
May 29	1 Day	5 infants in baskets.
May 30	2 Days	3 smallest infants in incubator.
June 3	6 Days	5% CO_2–95% O. inhalations.
June 7	10 Days	2 largest infants in incubator.
Sept. 1	3 Months	Placed in cots.
Sept. 22	4 Months	Moved to Dafoe Hospital.
Feb. 16	8 Months	Using infant chambers.

Dear Dr.

Will you please send me any information on the Quintuplets of Mr. and Mrs. Dionne, of the past till the future time and any for the future, if it is not inconvenient to do so.

The Blank High School has requested for me to do this please.

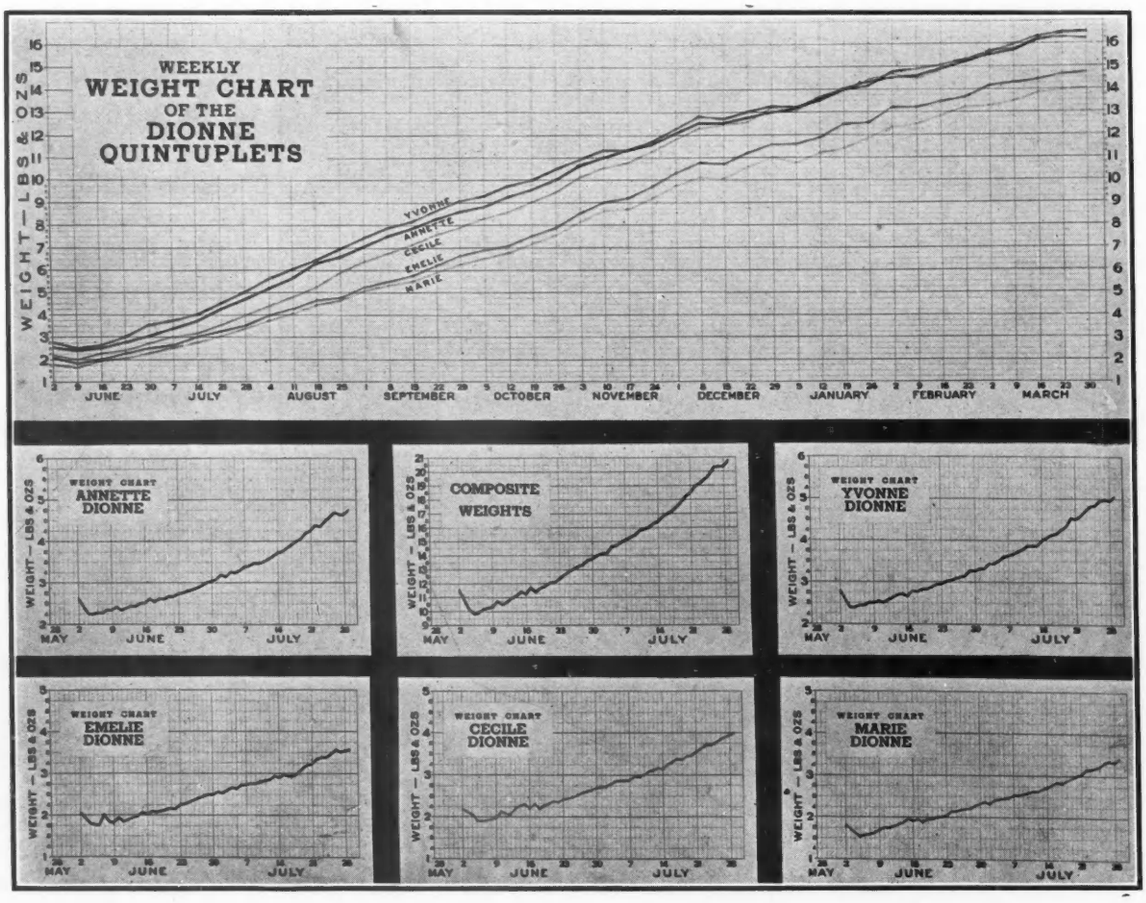
Yours truly,

Feedings.—During the first day, the babies were fed on warm water with an eye dropper every 2 hours. It was only possible to get them to take about 10 to 15 drops at one time. On the second and third days they were given 30 to 60 drops of a mixture containing 7 ounces of milk, 13 ounces of water, and 1 ounce of corn syrup. The milk and water was brought to a boil and the corn syrup gradually stirred into the mixture. A few drops of rum were added to all the feedings for the first week. On the fourth day we were receiving enough mother's milk from The Hospital for Sick Children, Toronto, to meet all the necessary requirements. The amount of breast milk was gradually increased from a drachm per feeding upwards, but the babies were three weeks old before they were able to take one ounce per feeding. The breast milk was used from the first at full strength, and it remained as the entire source of milk supply until the babies were nearly four months old. The daily supply of milk increased from 30 ounces per day in the first two weeks to nearly a gallon by the end of the fifth month. We managed to keep a small reserve supply in the refrigerator for emergencies.

A Breck feeder was substituted for the eye dropper on the sixth day, and at two months of age the babies were all taking their food from an ordinary feeding bottle. The feeding intervals were gradually increased, but with frequent setbacks, until at ten months the babies were fed four times a day.

The accompanying chart shows the caloric intake per pound in 24 hours of the smallest baby, Marie, and the heaviest, Yvonne. The caloric intakes of the other three ranged between these graphs, but in order to prevent confusion of lines they are not shown. At the end of two

CHART II.



weeks the babies were receiving 50 calories per pound per day. From that time on the smallest baby, as was to be expected, received more, and the intake level remained consistently above, but it gradually approached the others, until at 10 months of age the lines coincided at 50 calories per pound. This common level was also reached by the other three babies at this time. This amount of 40 calories represents the amount usually required for normal infants over 6 months of age.

The breast milk was changed on October 19th to a mixture of cow's milk, water and Dextri-Maltose. We only used the cow's milk for a few days because we couldn't depend upon it, and an evaporated milk was substituted for it. This formula, with the addition of lacto-bacillus acidophilus, was used until the infants were one year old. The *B. acidophilus* appeared to keep the bowel movements more regular and the stools normal in odour. From one-half to one ounce of tomato juice or orange juice was administered daily as an anti-scorbutic to each baby, starting on July 9th. Later the orange juice was increased to 3 to 4 ounces per baby and used thus for its cathartic value as well as for its vitamin C content.

On July 28th, when the infants were two months of age, vitamin D was given daily, first in the form of viosterol and then of cod liver oil. At the end of ten months each of the babies were receiving two drachms of cod liver oil per day. Prune juice was given from October 12th. The first solid food was used on October 26th in the form of "Pablum", a pre-cooked base-forming cereal, and this was given daily from this date. Assorted vegetables, cooked and strained, were added on January 5th, followed by egg yolk on January 12th, and on January 19th by cooked fruit pulp (apples, apricots, prunes).

Weight record.—On May 29th (2nd day of life) the combined weight of the babies was 13 pounds 6 ounces, but on June 4th the total weight of the five was less than ten pounds, and Marie weighed only one and one-half pounds. The weekly weight charts for the first ten months present a very steady upward trend, with the two smaller babies showing a somewhat slower rate of gain. After ten months the weights continued to increase, so that at one year each had gained about one pound over her weight at ten months.

Infection.—Every care has been taken to prevent exposure of these babies to infection. Almost the only people in direct contact with the babies have been the parents, the nurses and myself. Gowns and masks are used by all the attendants. In spite of these precautions, each of the babies during the month of March, 1935, developed an upper respiratory tract infection which extended to the ears. It was necessary to perform paracentesis on both the ear drums of little Marie. They all recovered somewhat slowly without further complications.

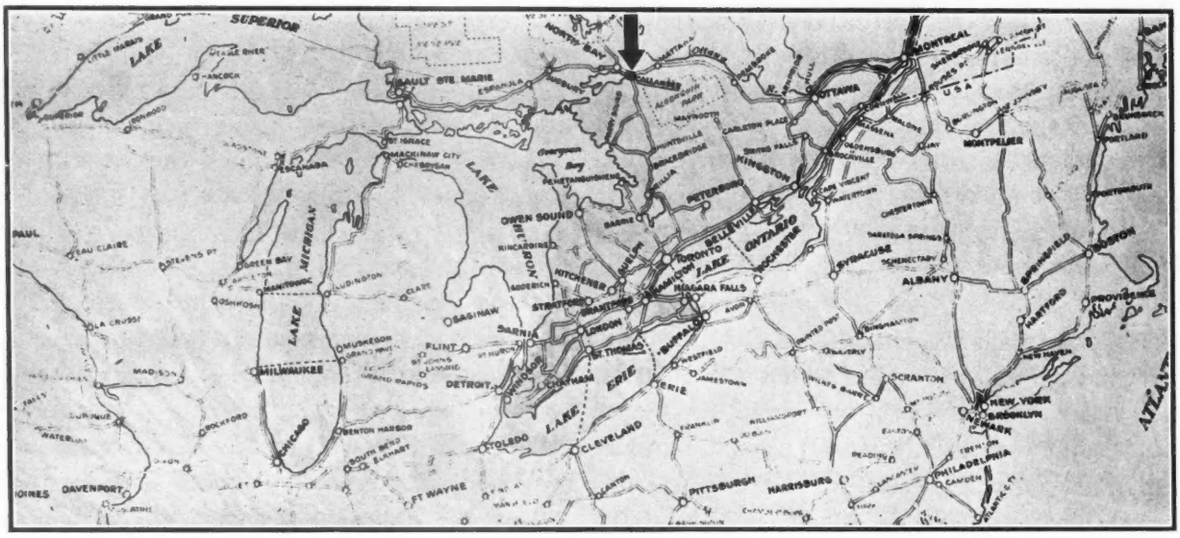
The hæmangioma on Marie's thigh required during the year three doses of radium emanations before it was completely obliterated.

The accompanying charts present in a graphic form the salient features, from a scientific standpoint as well as from a general interest standpoint, in the care and feeding of the Dionne quintuplets from birth to the age of ten months. These charts were exhibited at the international conference of the Canadian and American Associations in Atlantic City in June, 1935. My brother and myself have presented them to the Ontario Government as a permanent record of the essential details concerned with the growth of the quintuplets during their first year of life.

The many incidents associated with the birth, the survival, and the growth of the Dionne quintuplets rivals to my mind even the imaginative fantasies of Scheherazade as told in some of her life-saving stories in "The Thousand and One Nights". In looking backwards at the end of the first year of these babies' lives, I feel that their history portrays a modern fairy tale with a medical flavour. This medical fairy tale, however, differs from the make believe ones, because it is a true story of five babies who were actually born in rags but who have even in their short lives achieved riches.

I wish to express my appreciation for the very real help and constant advice in the care of these babies from my brother Dr. William A. Dafoe. Without his assistance it would have been impossible for me to keep the necessary records and to prepare the charts and manuscript which comprise this report.

CHART III.



CALLANDER ON THE MAP

INCIDENTS IN A MEDICAL FAIRY TALE

(In the last 500 years, there have been 33 cases of quintuplets authentically recorded — of these one group of five lived for 50 minutes and one out of another group survived for 50 days.)

BIRTH

A "Hurry up" Call to the Dionne home at 4.00 a.m. on May 28th, 1934, marked the beginning of a visit which resulted in the commencement of this fairy tale. The mother was suffering from pre-eclampsia and did not expect to be confined for two more months. On arrival at the home two babies were born, a third arriving, and that one was followed in a few minutes by two more.

It seemed impossible that all or even any of these babies would survive, but they were wrapped up in the only available coverings and kept as warm as possible. There was only one placenta.

The early struggle for the continued existence of these babies was intense, and the anxiety great. (There have been many other cares and worries associated with the survival and growth of these babies, due to the world-wide publicity which they have received.)

TEMPORARY GUARDIANSHIP

Towards the end of July, 1934—a temporary guardianship board was appointed by the government, with the consent of the parents, to circumvent certain exploitation plans.

HOSPITAL RECEPTION

On September 22, 1934, the five babies were removed to their new hospital home, where details of infant care could be properly carried out. There was a decided improvement in their general health following this move.

Since that, there has been a normal progress in their physical and mental growth. With the exception of an upper respiratory tract and middle ear infection, they have been free from all other ailments.

WARDS OF THE CROWN

In March, 1935, The Dionne Quintuplets Guardianship Act was passed by The Ontario Government which made The Dionne Quintuplets Special Wards of The Crown.

AT ONE YEAR

At one year of age, the babies are healthy and happy; their skin is tanned, their muscles firm and their bones well proportioned. In physical appearance they resemble one another closely, but not so in temperament. A scientific psychological study has commenced and will be carried on in the future. This investigation shows all the babies to be "at age" intellectually and developmentally, with the larger two slightly above.

THE FUTURE?

It would indeed be a wise man who could tell what the future has in store for these babies. Every effort will be made to keep them healthy and surround them in their growth period with the best traditions of their race, their religion, and their country.

The noblest of beings is man, and the meanest a dog; but intelligent persons agree that a grateful dog is better than an ungrateful man. A dog never forgets a morsel received, though thou throwest a stone at him a hundred times, but if thou cherishest a base fellow a lifetime, he will for a trifle suddenly fight with thee.—*Maxim LXXXVII* of the Sheik Sa'di of Shiraz.

Although a Sultan's garment of honour is dear, yet one's own old robe is more dear; and though the food of a great man may be delicious, the broken crumbs of one's own sack are more delicious. Vinegar by one's own labour, and vegetables, are better than bread received as alms, and veal.—*Maxim LXXVII* of the Sheik Sa'di of Shiraz.

THE TREATMENT OF CONGENITAL SYPHILIS WITH STOVARSOL

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AND

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IN the past five years a series of 51 patients with congenital syphilis has been studied through the out-patient department of the Winnipeg Children's Hospital. The majority of these patients had tardive congenital syphilis. Their ages on admission to the clinic ranged from a few weeks in the youngest to 15 years in the oldest. As will be seen in Fig. 1, two-thirds of them were over 6 years of age, and one-quarter were under 1 year. The sex distribution was nearly equal, 28 being male and the remaining 23 female.

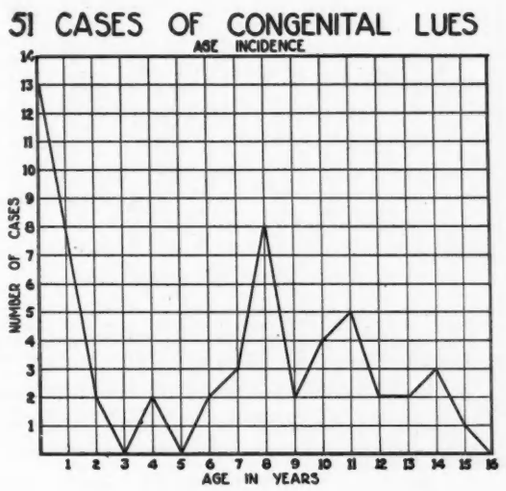
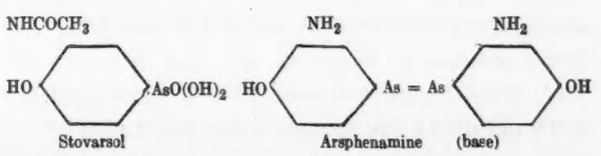


Fig. 1

Stovarsol was introduced into the clinic two years ago. Stovarsol is 3-amino-acetyl-4-hydroxyphenyl-arsonic acid, and was number 594 of Ehrlich's series. It is a pentavalent arsenic compound, and its structural formula as compared with arsphenamine is as follows:



Stovarsol is a white, odourless powder, having a slightly acid taste; is slightly soluble in solutions of alkalies or alkaline carbonates; is stable at ordinary temperatures; and contains from 27.1 to 27.4 per cent arsenic, in comparison to 20 per cent in neosalvarsan and 32 per cent in salvarsan. Stovarsol is the French name for the drug. In Germany it is known as "Spirocid", in Russia as "Osarol", and it has been accepted in "New and Non-official Remedies"[1] by the American Medical Association as "Acetarsone". Abt and Traisman[2] state that stovarsol was first used in the treatment of congenital syphilis in 1924 by H. Guillemont. They also give an excellent bibliography of its use for that purpose up to 1932.

Many toxic effects of stovarsol have been noted in the literature—coryza, bronchitis, sore throat, malaise, aching, chill, fever, abdominal pain, jaundice, adenitis, urticaria, œdema, albuminuria, eosinophilia, leucopenia and pruritic anal eczema. Two cases of myelitis have been reported by Glaser.[3] Maxwell and Glaser[4] have ably summarized the results of investigations on this problem up to the present. The reports are uniformly encouraging. It seems to be the consensus that stovarsol is less effective in reversing Wassermann reactions in older children than in infants, and that longer periods of treatment are necessary in older children.

TREATMENT

Of the 51 patients studied in the clinic, 37 have been treated for periods ranging from 1 to 10 years (Table I).

The 37 patients treated may be divided into two groups: (1) 27 patients, who were treated prior to the introduction of stovarsol in the clinic. They were treated by the intravenous and intramuscular methods and by inunction.

TABLE I
THE TREATMENT OF 51 CASES OF CONGENITAL SYPHILIS

Treated for more than 1 year	37
Treated for less than 1 year	3
Treated elsewhere	6
No treatment required	3
Lost trace of	2
	51

NOTE: The three patients treated for less than one year are recent additions to the series and therefore have been omitted from the results obtained.

For convenience, we shall call these the pre-stovarsol group. (2) 23 patients treated since stovarsol therapy was introduced to the clinic. This group contains 13 patients who were treated previously in the pre-stovarsol group without a cure being effected.

A comparison of the methods used and results obtained in treating these two groups of patients is very instructive. The patients in group 1 were treated with arsenicals, bismuth and mercury. The intramuscular route was given preference over the intravenous one. The method of administering stovarsol was in accordance with the plan of Maxwell and Glaser.[4] The scale of dosage is shown in Table II. The stovarsol tablet was 0.25 g. by weight, and was large enough to be readily cut into four. For infants it was dissolved in water or in part of the milk feeding.

TABLE II
THE DOSAGE OF STOVARSOL

¼	tablet once a day for one week
¼	tablet twice a day for one week
¼	tablet three times a day for one week
¼	tablet four times a day for one week
½	tablet three times a day for one week
½	tablet four times a day for one week
1	tablet twice a day for one week
TOTAL:	56 tablets (14 g.) in forty-nine days, followed by a six weeks' rest period.

RESULTS

The pre-stovarsol group of 27 patients were treated over a period of seven years as compared to two years for the stovarsol group of 23. As will be seen in Fig. 2, six Wassermann reactions became negative during the seven years of pre-stovarsol treatment. Then, with the introduction of stovarsol in October, 1932, there is an immediate trend to negative in the Wassermann reaction. In two years 14 blood reactions became negative and 2 were reduced to doubtful. Thus with stovarsol therapy, and in a smaller series of cases, more than twice as many cures were obtained in one-third the time required for pre-stovarsol treatment.

There was a general improvement in the physical condition of the patients after the introduction of stovarsol therapy. In the pre-stovarsol as well as the stovarsol series all luetic lesions yielded to treatment, and during the past two years the children have had a

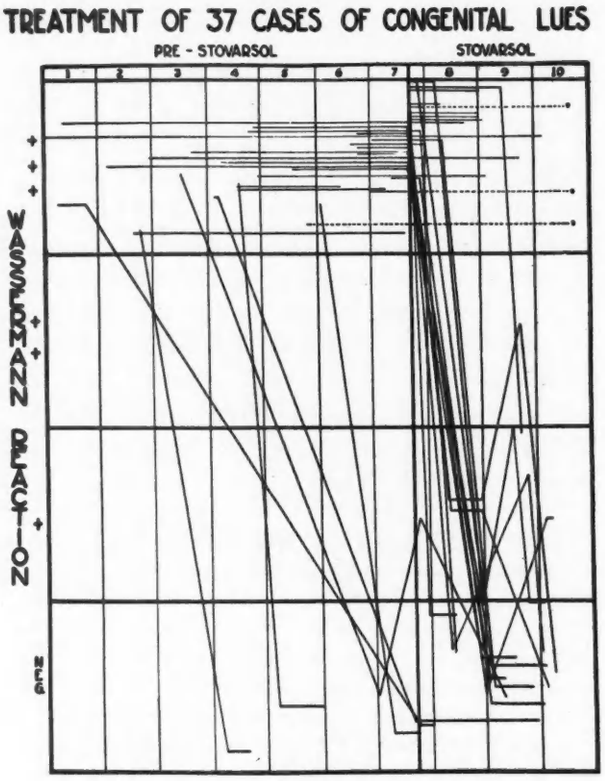


Fig. 2

healthier appearance and seem to be happier. The improvement in temperament is probably due, in part, to the removal of the element of fear caused by painful treatments in the pre-stovarsol days.

TOXIC SYMPTOMS

The definite toxic symptoms produced by stovarsol in this series of cases were all mild. In two cases, it caused headache, which was relieved by stopping the drug. It did not reappear when the medication was given after a rest period. In the third case it caused coryza, gastro-intestinal distress, and diarrhœa. These symptoms were present only while the drug was being given.

A brief history of each of the three patients with definite toxic symptoms is given here.

CASE 1

A girl, aged 11 years, was admitted to the Children's Hospital in 1932, with concussion of the brain. A blood Wassermann, taken because of suspicious teeth, was three plus. No history of luetic infection could be obtained from the mother, and her Wassermann was negative. The past history was negative except for a coryza when she was six weeks old. Physical examination revealed a bossed head, a flattened nose, and upper central incisor teeth that were spaced and lateral incisors that were pegged. She was treated from the outset with stovarsol by mouth. During her fourth course of stovarsol she complained of headache, which only occurred after taking the drug. The headache disappeared when the drug was not administered. Stovarsol was discontinued for three weeks and then started again without any further toxic symptoms. Her blood Wassermann reaction became negative after one year's treatment.

CASE 2

A girl, aged 2½ years, was referred to the clinic because of her family history. Her mother had a three plus Wassermann reaction and her father's blood was negative. She was the only child. At two months of age she lost weight, had a severe cold and peeling hands and feet. Physical examination revealed a bossed head, internal strabismus of the left eye, a sunken nasal bridge, palpable epitrochlear glands and an enlarged liver. The blood Wassermann reaction was three plus. During the first course of stovarsol treatment she vomited and developed diarrhœa. The drug was stopped and the toxic symptoms disappeared. A course of mercury inunctions was given and followed by a complete course of stovarsol without any reactions. A third course of stovarsol was then given and the child developed coryza. With cessation of the drug, the toxic symptoms disappeared. The Wassermann reaction is still three plus after one year of interrupted treatment.

CASE 3

A girl, aged 9½ years, was admitted to the clinic with interstitial keratitis. Her family history was negative. She had a definite photophobic facies and interstitial keratitis in the left eye. The blood Wassermann reaction was three plus. She was treated with stovarsol and complained of headache when the dose of stovarsol was increased to one tablet twice a day. She was admitted to the hospital and the course of stovarsol repeated without any toxic effects. Her blood Wassermann after one and one-half years treatment was three plus and her spinal fluid examination was negative.

DISCUSSION

Stovarsol was introduced into this clinic in October, 1932. The results obtained since that date have been much superior to those produced by the older methods of treatment (Fig. 2). The decided increase in the percentage of cases cured is enough in itself to assure this drug a permanent place in the therapy of congenital syphilis. In addition, it offers the following advantages over other forms of treatment:—

1. *The simplicity of exhibition.* — The oral method is much superior to the intravenous or the intramuscular route in children, for obvious reasons.

2. *Regular attendance at clinic.*—Syphilis in all its forms can only be cured by regular treatment. In the pre-stovarsol series of cases there were many irregular attendants at clinic. The children who did attend regularly had to be forced to by their parents or guardians. Since the introduction of stovarsol and the cessation of painful treatments there has been no difficulty in having the children attend the clinic regularly.

3. *Toxic effects.*—There have been fewer toxic effects in this series than are usually found with arsphenamine and neoarsphenamine. Those that have been produced were readily controlled by dosage.

4. *Cost.*—Treatment is much cheaper than by other methods. The stovarsol costs less and there is no additional equipment necessary for administration.

While the results obtained in this series have been highly satisfactory, it seems to us that better results might be obtained by using a graduated dosage of stovarsol. It is our intention to treat a series of cases using the method advocated by Bratusch-Marrain.[5]

SUMMARY

1. During the past five years 51 cases of congenital syphilis have been studied through the out-patient department of the Winnipeg Children's Hospital.

2. A description of stovarsol is given.

3. Thirty-seven cases of congenital syphilis were treated with stovarsol, given by mouth. There were 27 patients in the pre-stovarsol group and 23 in the stovarsol group.

4. The scale of dosage of stovarsol is given.

5. The results obtained in treating this series of cases are shown graphically (Fig. 2). Only 6 of the pre-stovarsol group of 27 became Wassermann-negative after seven years' treatment, while 14 became negative and 2 doubtful after two years' treatment with stovarsol.

6. Three patients had mild toxic symptoms.

7. The advantages of stovarsol as a therapeutic measure over the older forms of treatment are discussed.

CONCLUSION

Stovarsol given by mouth is a valuable method of treating congenital syphilis.

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SURGICAL EMERGENCIES IN GENERAL PRACTICE EXCLUSIVE OF TRAUMA*

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BY an abdominal emergency we mean an intraperitoneal catastrophe which demands an immediate laparotomy for its relief in order to save the patient's life.

All the catastrophes which may occur within the peritoneal cavity originate from one of three basic causes—acute inflammation, intestinal obstruction, or hæmorrhage.

Hæmorrhage may occur either into the gastrointestinal tract or into the peritoneal cavity. Hæmorrhage into the tract manifests itself by vomiting or passing blood. If the loss of blood is sufficient to create an emergency it becomes obvious that the blood passed or vomited will be bright red. The only real emergency which arises as a result of hæmorrhage into the gastrointestinal tract is the replacement of the fluid loss either by the intravenous administration of saline or of blood. The most common origins of hæmatemesis are ruptured œsophageal varices, which may be the result of Banti's disease in young patients or cirrhosis of the liver in the older patients. It is very rarely that the first hæmatemesis from Banti's disease will occur in a person past thirty years of age. Gastric polypi may be the source, and are often difficult to demonstrate, because many arise from the posterior wall of the fundus of the stomach. Their presence may explain a prolonged intractable anæmia for which no specific cause has been found.

The hæmatemesis most frequently met with is that from gastric or duodenal ulcer. No emergency procedure is necessary or advisable in such cases, and, while patients will die from hæmorrhage arising in a duodenal or gastric ulcer, they rarely die following the first, or even the second, hæmorrhage. For this reason we have empirically adopted a rule not only to advise, but to urge, operative procedure following a second massive hæmorrhage from a duodenal ulcer.

Rectal hæmorrhage of sufficient volume to create an emergency will arise from one of three sources—multiple polyposis of the colon, simple ulcer of the colon, most usually situated either in the cæcum or ascending colon, and carcinoma of the cæcum. Replacement of the fluid lost by intravenous administration of saline or blood, sedatives, and bed rest will control the emergency. In the case of a patient acutely ill who is not only passing dark blood but also vomiting dark blood we are immediately put on guard, and suspect the diagnosis of mesenteric thrombosis. Such a diagnosis demands a laparotomy, but if the diagnosis be missed the gravity of the error is lessened by the almost inevitable fatality which accompanies any procedure for a mesenteric thrombosis.

Hæmorrhage into the peritoneal cavity, not due to trauma, will arise either from the ovary or the Fallopian tube. Ectopic pregnancy is the more common. It is well to remember that, while in the classical case there is the history of a missed menstrual period, with slight vaginal bleeding two weeks later, accompanied by a crampy lower abdominal distress, or a sudden shock due to the volume of blood lost in the peritoneal cavity, an ectopic pregnancy may be present and rupture without any disturbance of menstruation. The absence of rigidity, the absence of vomiting, and the crampy pain, together with a normal temperature and a high leucocyte count, make us suspect hæmorrhage rather than an inflammatory process as the basis of the illness. In addition to this we have found almost uniformly a very marked diffuse cutaneous hyperæsthesia of the abdominal wall in cases where there is free blood in the peritoneal cavity. Also blood which has leaked between the peritoneal folds of the broad ligament is accompanied by vaginal hyperæsthesia, and bimanual examination will reveal the presence of a palpable mass. To think of a ruptured ectopic pregnancy as a possible cause of the patient's emergency will in most instances make the diagnosis obvious.

On the other hand, hæmorrhage from a ruptured Graafian follicle creates an emergency

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* A paper read at the meeting of the Ontario Medical Association at Port Arthur, May 30, 1935.

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because of the impossibility of distinguishing it from acute appendicitis. On only one occasion in our experience was the hæmorrhage of sufficient volume to demand an immediate laparotomy. In the other cases which we have operated upon the indication for operation in every instance was our inability to exclude acute appendicitis. The outstanding facts which have been elicited in this syndrome are: it usually occurs midway between menstrual periods, accompanied by a crampy pain, a high leucocyte count, normal temperature and no associated nausea or vomiting. If the left ovary be the source, the tenderness will be in the left iliac fossa, but the degree of tenderness seems incompatible with the patient's general symptoms. If the operation be undertaken with the possible diagnosis of acute appendicitis, and free blood be in the peritoneal cavity, one immediately suspects a ruptured follicle as being the source, and, on locating it, the ovary does not need to be sacrificed. The follicle may be shelled out, and a few mattress sutures will control the oozing.

The second catastrophe is due to obstruction of either the small or large bowel. The mortality from small bowel obstruction averages approximately 50 per cent in large hospitals. The mortality from small bowel obstruction due to strangulated hernia is 6 per cent. It becomes obvious, therefore, that the mortality is in direct ratio to the time interval which has elapsed between the onset of obstruction and operation. The difficulty of diagnosing small bowel intestinal obstruction, caused by internal strangulation from bands, results from the description of intestinal obstruction as enunciated in most surgical text books. The patient with a lethal small bowel obstruction in its early onset does not appear ill or shocked. The pulse and temperature are normal. There is rhythmical, colicky pain, accompanied by nausea. Both the pain and the colic will persist, in spite of the generous administration of sedatives. We have come to believe that a patient, and particularly a patient with the scar of a laparotomy wound, who suffers rhythmical colicky pain, accompanied by vomiting and unrelieved by sedatives, is suffering from a small bowel obstruction, and unless we can disprove this, rather than whether we can prove it, operation should be advised. One must remember that in small bowel obstruction there may be no abdominal distension. The obstruction may be located so high up in the small bowel that there is not sufficient length of gut to cause abdominal distention. One may further be led into the pitfall, in the later phase of obstruction, of diagnosing a peritonitis because of a high fever and a high leucocyte count. We have noted in such patients a pyrexia of 104° F. and a leucocyte count of 20,000, and no inflammatory lesion. This phenomenon we believe to be due to dehydration, the result of loss of tissue fluids into the lumen of the bowel and by vomiting. The value of the administration of intravenous normal and hypertonic saline, together with an indwelling duodenal tube, has become sufficiently widely recognized that this form of therapy might be instituted in a patient who is suspected but not proved to be suffering from intestinal obstruction. This treatment will entirely mask all our preconceived ideas of the symptomatology of small bowel obstruction. The patient's feeling of well-being will return and the pain will disappear, but if the fluid loss through the duodenal tube is maintained in large amounts, then one can be perfectly certain that the obstruction is unrelieved. A further pitfall is the comfort which the physician often takes from the passage of gas following enemata. This in our experience is no contraindication to the diagnosis of small bowel obstruction. Sufficient gas may accumulate in the colon to be passed per rectum, and yet the patient suffer a lethal small bowel obstruction. If, in a case where we strongly suspect a small bowel obstruction, it is possible to elicit a splash or succussion sound in a distended coil of bowel we need no further evidence to warrant a laparotomy. There is one condition which may simulate small bowel obstruction so closely that unless it is ruled out we shall be led into an unnecessary laparotomy. This is lead colic. If the patient's occupation is such that lead colic may be a cause, we are not dependent solely on this fact, plus the presence of a blue line about the gum margins, to reach a diagnosis, because, if suspected, the intravenous administration of 5 c.c. of a 10 per cent solution of calcium chloride will immediately relieve the symptoms.

Large bowel obstruction, on the other hand, presents an entirely different clinical picture. Apart from intussusception, which occurs in childhood, there are very few instances of acute intestinal obstruction arising in the colon in patients under forty years of age. Vomiting

is conspicuous by its absence. Abdominal distension is marked. Colicky pain is present in a much lesser degree than in small bowel obstruction. Absolute constipation, as evidenced by the futility of enemata, is present. In an analysis of our cases we found only four causes: volvulus of the sigmoid; volvulus of the cæcum; peri-colic bands, and carcinoma of the colon. Peri-colic bands are of very infrequent occurrence, and, from the standpoint of treatment, respond to the same procedure as we shall discuss for carcinoma of the colon. Of volvulus of the cæcum and the sigmoid we have only met with two of each, and in none of these four cases was the diagnosis difficult, because of the presence of a localized tumour due to the distended cæcum or sigmoid.

We are thus left with carcinoma of the colon as the major cause of acute intestinal obstruction in the large bowel. In the last series of our cases which we analyzed this was present in 76 per cent, and in all cases of intestinal obstruction, including that of the large or small bowel, it was responsible for 18 per cent. There is fortunately in most of the cases a history of increasing constipation, a gradually increasing necessity for more drastic cathartics for some months prior to the acute catastrophe. We have not found a single case of acute intestinal obstruction of the colon due to cancer which was not distal to the cæcum. If one has the facilities of a large hospital, a flat x-ray plate of the abdomen will show the ladder pattern so characteristic of dilated small bowel in the presence of small bowel obstruction and the dilated colon in the case of large bowel obstruction. The site of the obstruction may be confirmed by the administration of a barium enema, which will stop abruptly at the obstructed point. On the other hand, one may be confronted with a case of obstruction where such facilities are not available, and where the patient cannot face the rigours of transportation to a large hospital. What, then, should be our procedure? When we realize that in excellent hospitals the average mortality from intestinal obstruction is approximately 50 per cent, and yet a simple laparotomy carries less than 1 per cent mortality, it appeals to us that if we cannot exclude definitely an intestinal obstruction the patient is entitled to a laparotomy. It may be impossible before operation to determine with certainty whether we are dealing with a small or large bowel origin. We further know that such patients stand operation very badly because of dehydration and its associated biochemical upset. Therefore the administration of large amounts of fluid prior to operation justifies the delay entailed. In late obstruction we have given as high as 5,000 c.c. of fluid before operation in a few hours. Because of the tremendous dehydration which such patients suffer they will tolerate such a large volume of fluid intravenously. Aiming at relieving the obstruction by the most simple and atraumatic procedure, we first open the abdomen by a split-muscle incision. If the cæcum and terminal ileum are distended we know that the obstruction is distal to this point, and we simply bring an area of cæcum the size of a plum through the skin and suture it by four interrupted sutures to the skin margin. This may be painlessly opened by the cautery in twelve to twenty-four hours. It may be stated that this patient is suffering from cancer of the colon, and we have not dealt with it. Such is true, but the underlying principle of dealing solely with the condition which has created the emergency is fulfilled, and a disregard of this principle in any abdominal emergency increases the mortality in direct ratio to the degree to which it is disregarded. If, on the other hand, we find the cæcum and terminal ileum are not distended, then we know that the site of the obstruction is in the small bowel, and a para-medial laparotomy wound is essential to locate and effectively deal with the causative lesion. After relief of the obstruction in patients who are very ill, an ileostomy tube placed in the bowel by the Weitzel method proximal to the obstructed site has proved of real value in our hands. Its efficiency is in the inverse ratio to the duration of the obstruction. The subcutaneous administration of pituitrin 1 c.c. and eserine, gr. 1/50, every one to three hours, is of the greatest value in the convalescence.

The third catastrophe is the result of an acute intraperitoneal inflammation. While one may multiply the origins of an acute intraperitoneal inflammation, in general practice there are really only two that need seriously to be considered in an emergency, namely, a perforated ulcer and an acute appendicitis.

The other sources of acute intraperitoneal inflammation, such as primary peritonitis, acute cholecystitis, acute pancreatitis, perforative sigmoid diverticulitis, twisted ovarian cysts, and degenerated fibroids do not carry in their wake the terrific tragedy which delay in carrying out a laparotomy entails on the patient with a perforated ulcer or an acute appendicitis. Our sheet-anchor in the diagnosis of an acute intraperitoneal inflammatory lesion lies in the presence of three findings: first, the association of pain and tenderness; secondly, one point of maximum tenderness; and, thirdly, both pain and tenderness, aggravated by the patient quickly rolling over in bed. While there are many extra-peritoneal lesions which produce clinical syndromes which might be confused with a true intra-peritoneal lesion, I know of no such extra-peritoneal lesion which will fulfil the three above requirements.

The common extra-peritoneal lesions which produce symptoms referable to the abdomen are those associated with the respiratory or genito-urinary systems. In all such cases we find an abrupt onset. The temperature is usually 102° or over within twenty-four hours of onset, and the leucocyte count is usually well over 15,000 when the patient is first seen. Such extra-peritoneal lesions often render difficult the exclusion of an acute appendicitis. We believe that acute appendicitis is very rarely ushered in with a chill, and that in adults, but not in children, the temperature is rarely 102° or over within twenty-four hours of the onset of the distress. These findings, together with the absence of the trinity enunciated above, serve to put one on guard.

A perforated gastric or duodenal ulcer should not present great difficulty in diagnosis. Less than 50 per cent of such patients will give a previous history of indigestion. The pitfall in the diagnosis is the so-called latent period, in which, following an interval of ten minutes to one-half hour of severe distress, the patient is comfortable. If one has the opportunity of seeing the patient for the first time during this quiescent period, the temperature and pulse may be normal, but the trinity of symptoms of acute intra-peritoneal inflammation is present, together with the additional evidence of definite, true muscular rigidity. True muscular rigidity never changes during the respiratory cycle, while voluntary rigidity has a momentary relaxation at the end of inspiration. In no intra-peritoneal disaster has the principle of dealing solely with the lesion producing the disaster yielded happier results in our hands. We have only one responsibility to a patient who suffers a perforated duodenal ulcer, namely, to save his life; we have no responsibility whatever in regard to the cure of his ulcer. With the simplified procedure which we now carry out even the most inexperienced physician could do it equally well. There is no perforated ulcer which is difficult to close by our technique. We make a small incision. To locate the ulcer is not difficult; and we put in three interrupted sutures, one of which goes across the perforation and one above and one below. Then, taking a free fat graft from the great omentum, just tie the sutures sufficiently tight to hold this fat graft in place, and the operation is over. No further exploration is done, and, in our experience, drainage seems of little importance. Using this principle we have operated upon in our Surgical Division 36 consecutive patients who suffered perforated duodenal ulcer without a fatality. Sixteen of these patients subsequently had to be operated upon, and none died as a result of the secondary operation.

We discussed at last year's meeting the management of patients who suffer from acute cholecystitis. At that time we felt that, could the diagnosis be established, one always had time to restore fluids and secure rest, and that there never was in acute cholecystitis an indication for a precipitate operation. Our experience during the last year has confirmed this attitude, and our mortality of 5.8 per cent has not been increased.

If one could but diagnose acute hæmorrhagic pancreatitis operation could be avoided. We have been convinced that patients will recover from acute hæmorrhagic pancreatitis of great severity without operative interference, and it is doubtful if operation carried out on such patients, which will still have to be done because of the difficulty in excluding other causes for the acute lesion, ever accomplished much in adding to the safety of their convalescence.

We are thus left with a consideration of acute appendicitis. The fact that the mortality from acute appendicitis in the United States

and Canada is steadily rising is conclusive evidence that we are failing in the treatment of this disease. The attitude of the patient, as well as of many physicians and surgeons—"It was just an appendix"—I believe is responsible for this mortality. The diagnosis of the atypical cases of acute appendicitis presents the greatest difficulty. On our Division last year we had fifteen errors in diagnosis, eight of which were concerned with the diagnosis of acute appendicitis. There are two pitfalls in the diagnosis of acute appendicitis. The first is the development of an acute inflammatory process on top of a mechanical obstruction in the appendix due to a fæcolith. This may come on some hours or days after the onset of pain in the right iliac fossa. The second, and much more real pitfall, however, accompanies an acutely inflamed appendix located in the pelvis. There may be no abdominal tenderness, very little abdominal pain, no abdominal rigidity; urinary frequency is present, and red and white blood cells are found in the urine. Unless one does a routine rectal examination on every patient with abdominal symptoms the diagnosis of an acutely inflamed appendix which is lying in the pelvis will be over-looked, and the presence of pus and red blood cells and urinary frequency may lead to a diagnosis of a urinary condition. Such located appendices often have an associated diarrhœa, and failure to do a rectal examination may lead to the diagnosis of colitis or enteritis. The difficulty in the diagnosis of the atypical cases of appendicitis has led us now to regard a patient who suffers periumbilical pain, which later moves to the lower abdomen, as suffering from acute appendicitis until this diagnosis is disproved. It is surely much less disastrous to remove a normal appendix than to wait until perforation occurs, with its attendant mortality of 17 per cent. One may have no opportunity to see a patient who has suffered from acute appendicitis until a mass is palpable in the right lower quadrant. While such a patient may have suffered from acute appendicitis, the disease now has gone beyond the appendix and becomes a localized peritonitis, with, in most instances in our experience where a mass is palpable, the association of suppuration. Such patients are tired, starved and dehydrated. The actual cause of their illness lies in this biochemical upset. Therefore this should be corrected before any procedure is carried out on the local lesion. We thus believe that no patient who suffers an acute appendicitis and who develops a mass in the right iliac fossa is ever a candidate for an emergency operation. In the last five years we have had admitted to our Surgical Division 38 patients with masses in the right iliac fossa following acute appendicitis. None of these was operated upon as an emergency; 29 recovered without operation; 9 simply had the abscess drained. When a patient has an abdominal abscess why should we treat it differently from an abscess elsewhere? The drainage of the abscess will surmount the present emergency, and the appendix may be removed later. We have advised that such patients return in three months for removal of the appendix, and in the five-year period only four have failed to follow this advice. Our indications for draining an abscess are: increase in the size of the mass, and the persistence of the pain, with a continued acceleration of the pulse rate. We believe that the elevation of the temperature is not comparable to elevation of the pulse rate as an indication for active interference.

CONCLUSIONS

1. The fundamental principle in dealing with abdominal surgical emergencies is to carry out the simplest operative procedure which will deal solely with the lesion which creates the emergency.

2. In many patients the major lesion is the biochemical upset, which overshadows the basic lesion. The correction of this by the administration of intravenous fluids, such as saline, glucose or blood, before operation is undertaken, will often convert a desperate situation into one amenable to treatment.

3. The three basic lesions responsible for intra-peritoneal disaster are acute inflammatory processes, intestinal obstruction, and hæmorrhage into the lumen of the gastro-intestinal tract or into the peritoneal cavity.

4. The mortality of small bowel obstruction is in direct ratio to the interval between the onset of obstruction and its relief.

5. In large bowel obstruction, a simple blind cæcostomy will relieve every case except those due to volvulus of the cæcum or sigmoid.

OBESITY AND ITS TREATMENT*

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IT can safely be said that the early problems of obesity are seldom encountered by the general practitioner. The exceeding prevalence of the condition, and the contentment of the individual with his state fail to occasion interest until associated pathological changes bring the patient to his doctor for relief. Much of our difficulty is bound up with the so-called "higher standard of living", and the developments of the machine age. Not only are these developments direct energy-saving devices, but there is an important psychological repercussion which diminishes the incentive, as well as the necessity, for work. The insidious onset of the over-nourished state which passes gradually into obesity is unnoticed. It must be admitted that most people like to eat, and provision of an ever-increasing variety of tempting foods within the purchasing power of an increasing proportion of the population adds to the difficulty of the situation.

It is well known that it is much easier to remain normal than to remove superfluous fat once acquired. Body weight may increase by changes in the composition of the bones and muscles and by alterations in the water balance. This is not obesity, but is a normal physiological response, unless carried to an excessive degree in either direction. Obesity may be defined as an excessive deposition of fat on the body, a state of hypernutrition. Within limits a certain disproportion of fat to other tissues during a part of the growth period is not unphysiological, and during early adult life life insurance statistics reveal a better expectancy of life for those who are slightly overweight, while at the same time pointing in no uncertain fashion to the dangers of definite obesity in the fourth and succeeding decades.

A considerable amount of investigation has been done on obese subjects with the object of determining whether any fundamental physiological change has taken place which permits or encourages the development of obesity. At present the evidence does not warrant the belief that there is any one qualitative abnormality which predisposes to overweight in all individuals. The specific dynamic response to food has been stated to be abnormally low, and this is probably true in some cases, but is by no means a universal finding. Occasionally one encounters a reduction in the level of basal metabolism. Except in some endocrine disorders, however, this is an unusual factor and the basal metabolism of an obese person may exceed his ideal basal metabolism by large amounts. The efficiency of muscle work is believed by some to exceed the normal, thus sparing calories. This contention, however, does not go unchallenged. A diminution in muscle activity would undoubtedly lead, when food intake remains the same, to the laying on of fat, and may be a potent factor in many cases of obesity; in other words, the patient who is overweight avoids fatigue, becomes lazy, and progressively more economical of muscle activity. Besides the influence of energy conservation, various endocrine influences have been credited with the production of obesity, and a lipophilic tendency has been postulated, heredity and constitutional factors have been incriminated, and many other theories have been proposed with more or less evidence to support them. At the present time we are completely unable to explain the peculiar distribution of fat in certain individuals on a purely energy balance basis, and must look for additional causes in the endocrine system and elsewhere. Nevertheless, in all cases, a fundamental factor in the development of obesity is the intake of food in excess of requirement. This is readily acknowledged, but it is not so clearly seen as it should be that all individuals lose fat if the energy intake is less than the energy output. In many so-called endogenous cases it has proved, for various reasons, so difficult to bring about an energy deficit that these patients have often been assumed to have a special dispensation from the law of conservation of energy. Institutional treatment, the use of weighed diets and thyroid preparations will soon dispose of this fallacy.

A factor which in my opinion has been given too little attention in the difficult cases who fail

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Read at the Combined Meeting of the Ontario and Manitoba Medical Associations, at Fort William, May, 1935.

to lose weight under treatment is not primarily an obesity problem. This is the relationship of the protein, salts, water, and acid-base balance. A considerable but variable weight of the body is the so-called dead, storage, or deposit protein, a colloid capable of retaining water in varying amounts according to the amount of accompanying salts and the acid-base balance. It is, I feel, a mistake to completely prevent protein loss in these cases, as so many do, by feeding diets containing excessively large amounts of protein.

The decision as to the necessity for a reduction cure in any given case must be the responsibility of the physician. He must consider first whether obesity exists, and, next, the advisability of treating it, in view of the attendant circumstances. For the answer to the first question one is dependent upon the inspection and palpation of the patient for surplus adipose tissue. While it is true that gross obesity may be determined by reference to height-weight-age tables, there is no more common fallacy in clinical medicine than that such tables represent the ideal ratio, and that variations from them are to be regarded as under-nutrition or obesity. There are races, types, and breeds of men, and not all are cast in the same mould. Moreover, such tables represent averages, and the physician is always dealing with an individual, not a statistic. Again, a patient may be locally obese (certain endocrine diseases furnish us with numerous examples), and the body weight may even be below the standard values. A careful study of the clinical history, and general physical examination of the patient will usually make possible a decision on the advisability of treating the obesity. Unless grossly obese, the young should not be reduced; likewise, decrepit and aged people stand reduction badly. Sometimes psychoses and nervous breakdowns are traceable to marked under-nutrition, while the inadvisability of under-nourishing the anæmic and those suffering from chronic infections is well understood. Positive indications for reduction of excess weight exist in those patients who have, or may acquire, the degenerative diseases of heart, liver, pancreas, and blood vessels. The danger of infections in obese subjects, as well as the risk of surgical operations, is materially increased. Patients who are grossly overweight (25 per cent above the normal average) usually need reduction. With the intermediate group, 10 to 25 per cent overweight, and obese, one may undertake reduction if other symptoms warrant it. Though not strictly suffering from obesity, plethoric hypertensive people who are a little short of breath often benefit by a slight reduction in body weight.

It is apparent that a diet for the treatment of obesity must be lower in energy value than the energy utilization of the individual. The basal caloric requirements of normal persons 40 years of age runs between 1,400 and 1,800 calories. A more exact requirement can be calculated from Aub-DuBois or Benedict tables. The obese person will have a somewhat larger basal requirement in proportion to his increased surface area. To this must also be added an allowance for work, and, under normal conditions, an allowance for the specific dynamic action of food. Under dietary conditions, whenever the energy requirement is not met by the intake, and particularly when protein food is but slightly above that required to replace the wear and tear, the latter factor is likely to be small. An allowance of 25 to 40 per cent above basal requirements will cover the physical work done by the average obese patient. On the whole, then, a diet of 1,000 calories per day, given to a moderately active obese person, may be expected, since the fuel value of tissue fat rarely exceeds 3,500 calories per pound, to cause a weight loss of slightly more than one-third of a pound per day or two pounds per week. Given to a patient with other physical disabilities precluding exercise, the fall in weight will naturally be somewhat less. In most of such cases, however, this will not prove a disadvantage, and, if necessary, the cautious use of small doses of dried thyroid gland may be substituted.

Loss of weight in the absence of any great store of carbohydrate in the body must necessarily fall on the proteins, the water stores, and the fat stores of the body. Little water accompanies the fat in the fat deposits, but 60 per cent of the weight of the muscles is water, and, in consequence, protein destruction causes rapid loss of weight. This is accompanied by a feeling of weakness similar to that of the diabetic with denutrition, a condition quite different from the feeling of temporary muscle exhaustion which accompanies excessive exercise on a diet deficient in carbohydrate calories. The latter is to be treated by increase in the carbohydrates of the food, but the former is better prevented by furnishing a reduction diet not excessively deficient in protein. Usually 60 g. of protein per day suffices for this purpose; short people are often content with 50 g.

Provision of some carbohydrate in the diet is necessary. Its judicious use may provide the patient with all varieties of foodstuffs in certain amounts, sufficient bulk, sufficient mineral salts, sufficient fluid, sufficient vitamins, and, at the same time, take care of the antiketogenic requirements which increase rapidly with any additional work performed by the patient. Contentment with the diet, a knowledge that there is no food forbidden him, a sense of well-being, and the satiety produced by a full stomach are important factors in the treatment.

In diets markedly restricted in carbohydrates the mineral elements calcium, phosphorus, and iron have usually tended to be too low. Vitamins also have commonly been present in too small amounts. In view of a certain storage of these substances, perhaps one need not be worried unduly in cases where dietary restriction is necessary for but a short period. When there is necessity for prolonged dieting, however, the provision of mineral salts and vitamins in the diet should be adequate. The bulk of the diet is important. It contributes much to the comfort or discomfort of the patient, and should be adjusted to his requirements. Diabetic specialists long ago learned the lesson that a well filled patient was more content with his restricted diet than when he was constantly hungry. It may sometimes be true that a fat person is actually a small eater, as he so often claims. Such patients, however, eat highly concentrated foods, and largely avoid the more bulky articles of diet. It may be necessary to select carefully for their diet those vegetables for which they have not a definite aversion, and particularly to avoid monotonous repetition of badly cooked vegetables. When judiciously used, 100 g. of carbohydrate will provide adequate bulk, and carry with it a suitable amount of mineral salts and vitamins.

The remaining 360 calories may be served as fats. The construction of a diet containing only 40 g. of fat formerly presented some difficulties on account of the considerable amount of fat accompanying the protein in meats, eggs, etc. At my request, Miss Hanna[1] undertook to analyze a considerable number of cooked meats, from which she removed the visible fat. The summary table reproduced herewith shows that, with few exceptions, the protein content of such meats approximates 30 per cent, while the remaining fat is close to 5 per cent. By this device many meats not otherwise available because of their high fat content, may be used, and it is unnecessary to inflict the limited variety of foods on other members of the household. In most households, cooking for one particular member of the family becomes a monotonous chore, and should only be resorted to when it can be justified by exigencies of the disease. Obesity, in the eyes of most people, does not fall into such a category, and many people find that they cannot diet successfully when the dietary of the whole household is tied to their requirements. It is possible to make this diet for the patient from such foods as are being used by the other members of the family. This eliminates one important difficulty in dieting. The most important difficulty, however, is in the patient himself, and his relationship with his physician and the attitude of the physician to the patient's problem. Too often, the patient's desire to become more normal is treated in a joking manner, or he is given rather indefinite advice about stopping the use of certain

TABLE I.

	Meat	*Protein, Per cent*	*Fat, Per cent*
	BEEF:		
1	Prime ribs, roasted	26.9	5.4
2	Boiled	31.1	8.4
3	Steak, tenderloin, broiled (rare)	23.9	12.6
4	Steak, tenderloin, broiled (well done)	28.5	9.1
5	Steak, sirloin, broiled	27.4	6.0
6	Steak, round, broiled	29.8	3.1
7	Steak, round, boiled	28.0	3.1
8	Liver, calves', fried	24.0	8.5
9	Tongue, boiled, anterior portion	21.8	15.3
10	Tongue, boiled, posterior portion	21.0	25.5
11	Sweetbreads, boiled	22.2	8.6
12	Sweetbreads, broiled	25.7	9.1
	VEAL:		
13	Leg, roasted	33.3	4.1
14	Cutlet, broiled	28.4	3.4
	LAMB:		
15	Leg, roasted	29.1	5.4
16	Chop, broiled	27.6	7.4
	PORK:		
17	Chop, broiled	28.6	7.2
18	Loin, roasted	31.0	6.8
19	Leg, roasted	33.4	4.5
20	Ham, baked or boiled	26.4	4.9
21	Ham, broiled	28.7	4.3
22	Bacon, back, pea-mealed, fried	27.1	4.6
23	Bacon, breakfast, broiled crisp	35.8	45.6
	CHICKEN:		
24	Roasted, light meat	30.2	0.9
25	Roasted, dark meat	30.0	4.5
26	Broiled, light meat	31.8	1.1
	TURKEY:		
27	Roasted, light meat	33.4	2.2
28	Roasted, dark meat	27.9	7.3
	DUCK:		
29	Roasted	31.6	4.7
	RABBIT:		
30	Broiled, front quarter	30.1	4.3
31	Broiled, hind quarter	31.0	2.4
32	Boiled, front quarter	27.5	1.0
33	Boiled, hind quarter	28.9	1.1
	SALMON:		
34	Freshly boiled	25.7	1.2

foods, walking more, and so on. It is plain for the patient to see that he will get nowhere on such a program, and unfortunately he suspects that the medical profession has not much to offer, and that, in any case, they do not take his problem seriously.

Numerous dietary schemes have been prescribed in the past. None of them has the slightest value to the patient who does not stick to it. The patient who merely has the wish but not the will to reduce may always be assured of a disappointing result. Each patient is a psychological study. The patient's motives for reducing should be uncovered, or invented for him. His physical disabilities, present and possible, requiring a reduction cure, should be pointed out to him. The plan of treatment should be thoroughly explained as well as the results to be anticipated by adherence to the regimen. Encouragement, confidence, competition, praise, flattery, astonishment, doubt, derision, blame, and disappointment may be invoked to contribute to a successful result. Most patients are probably better started on their reduction cure in an institution, but good results are also to be obtained in the home. It is inadvisable to attempt to diet without weighing at least the more concentrated foods. The first deviation from precise instructions should not be too lightly condoned. Care, on the other hand, should be taken not to make such instructions impossibly rigid and austere. It is, for example, a psychological mistake to ask an obese patient to diet away from home. Sufficient flexibility should exist in the scheme to provide for most human relationships and alterations devised to accommodate unusual situations. The resentful or the coerced patient is usually little credit to his physician. A few patients will make a business of dieting; most diet at leisure; they are playing a game; what they win they keep, if they will it so. Table II. shows a selection of three diets for breakfast. Each of these diets, while varying slightly in protein, fat, and carbohydrate content, approximates 330 calories. These menus are suggestions only. Some patients will use them alternately, while others prefer some modification of them. The morning meal in America tends to be relatively the same. Many patients will pick a menu nearest to their desires and use it repeatedly with but the slightest modification. Equivalent amounts of jam may be substituted for a fruit, or other changes may be made to suit the individual. Where these alterations involve the introduction of additional calories, the favourable result is to that extent endangered, but usually compensating changes can be made.

TABLE II.

BREAKFASTS

Food	*Protein*	*Fat*	*Carbohydrate*	
Orange, peeled, or juice, or any other 10 per cent fruit, 80 g.	...	...	8.0	
Puffed rice or wheat, 15 g.	1.2	...	12.0	
Egg, one	6.0	6.0	...	
Back bacon (V.F.R.), 25 g.	7.5	1.0	...	
Bread, 20 g.	1.8	...	11.0	
Skim milk, 100 c.c.	3.0	...	5.0	
Butter, 7 g.	...	6.0	...	
Tea or coffee, saccharin...				
	19.5	13.0	36.0	339 calories
V.F.R. visible fat removed.				
Grapefruit, 150 g.	...	...	10.5	
Rolled oats (dry weight), 25 g.	3.7	1.7	16.3	
Egg, one	6.0	6.0	...	
Back bacon (V.F.R.), 25 g.	7.5	1.0	...	
Milk, 120 c.c.	3.6	4.8	6.0	
Tea or coffee, saccharin...				
	20.8	13.5	32.8	336 calories
Tomato juice, 120 c.c.	...	...	3.6	
Egg, one	6.0	6.0	...	
Cottage cheese, 15 g.	3.0	...	0.5	
Bread, 50 g.	4.5	...	27.4	
Skim milk, 50 c.c.	1.5	...	2.5	
Butter, 10 g.	...	8.5	...	
Tea or coffee				
	15.0	14.5	34.0	326 calories

In the two following tables are three luncheons and three dinners, each containing approximately one-third of a thousand calories. Any combination of these nine meals may be employed. The meats with visible fat removed may be replaced by equal quantities of other meats listed in Table I, previously shown. Simply cutting away the visible fat from the meat cooked for other members of the family makes it available for the patient. Roasting, baking, broiling, boiling, or frying, are methods of cooking employed. Frying may be done, using a part of the butter allowed, or mineral oil may be used. Garnishing by means of mushrooms, truffles, or other non-nutrients makes a pleasing variation in the diet. Suitable bulk is supplied by the liberal use of fresh or canned vegetables. A variety of these is suggested in the following table, due originally, to Joslin. If it is necessary to increase the bulk the higher percentage vegetables may be replaced by those of low carbohydrate content and contraction of volume accomplished by serving the equivalent in higher percentage vegetables. It may also be noted

TABLE III.

LUNCHEONS

Food	*Protein*	*Fat*	*Carbohydrate*	
Vegetable soup, 1 portion.	...	...	5.0	
Roast lamb (V.F.R.), 60 g.	18.0	3.0	...	
Vegetable, 10 per cent, 130 g.	...	...	8.0	
Vegetable, 5 per cent, 170 g.	...	...	5.0	
Vegetable salad, 5 per cent, 100 g.	...	...	3.0	
Mineral oil mayonnaise...	...	...	...	
Bread, 20 g.	1.8	...	11.0	
Butter, 10 g.	...	8.5	...	
Skim milk, 50 c.c.	1.5	...	2.5	
Tea or coffee, etc.				
	21.3	11.5	34.5	327 calories
Broth, 1 portion	...	...	...	
Boiled ham (V.F.R.), 60 g.	18.0	3.0	...	
Vegetable, 5 per cent, 100 g.	...	...	3.0	
Vegetable, 5 per cent, 100 g.	...	...	3.0	
Bread, 30 g.	2.7	...	16.5	
Butter, 10 g.	...	8.5	...	
Skim milk, 50 c.c.	1.5	...	2.5	
Fruit salad, 10 per cent, 100 g.	...	...	10.0	
Tea or coffee				
	22.2	11.5	35.0	332 calories
Julienne, 1 portion	...	...	...	
Salmon, baked or boiled, 75 g.	17.5	0.9	...	
Butter sauce, 1 dsp., 7 g.	...	6.0	...	
Potato, boiled, 75 g.	...	...	15.0	
Vegetable 10 per cent, 100 g.	...	...	6.0	
Vegetable salad, 5 per cent, 100 g.	...	...	3.0	
Mineral oil mayonnaise...	...	...	...	
Custard, 1	4.5	5.0	4.0	
Milk, 50 c.c.	1.5	2.0	2.5	
	23.5	13.9	30.5	341 calories

Salmon may be omitted, substituting 95 g. bass, flounder, pike, or brook trout, or filleted fish weighed raw; cooked by baking, boiling, or frying in mineral oil.

TABLE IV.

DINNERS

Food	*Protein*	*Fat*	*Carbohydrate*	
Consommé, 1 portion	...	...	...	
Roast beef (V.F.R.), 60 g.	18.0	3.0	...	
Potato, 60 g.	...	...	12.0	
Vegetable, 5 per cent, 150 g.	...	...	4.5	
Bread, 25 g.	2.2	...	14.0	
Butter, 8 g.	...	7.0	...	
Milk, 50 c.c.	1.5	2.0	2.5	
D'Zerta	2.0	...	...	
Tea or coffee				
	23.7	12.0	33.0	335 calories
Soup with Vegetable, 1 portion	...	...	5.0	
Round steak (V.F.R.), 60 g.	18.0	3.0	...	
Potatoes, French fried, 40 g.	...	...	11.6	
Vegetable, 5 per cent, 170 g.	...	...	5.0	
Bread, 20 g.	1.8	...	11.0	
Butter, 10 g.	...	8.5	...	
Fruit, 10 per cent, 70 g.	...	...	7.0	
Clear tea, or tea with saccharin or lemon				
	19.8	11.5	39.6	341 calories
Bouillon, 1 portion	...	...	...	
Pork chop (V.F.R.), 60 g.	18.0	3.0	...	
Potatoes, French fried, 40 g.	...	...	11.6	
Vegetable, 5 per cent, 100 g.	...	...	3.0	
Bread, 20 g.	1.8	...	11.0	
Butter, 9 g.	...	7.7	...	
Fresh fruit, 10 per cent, 70 g.	...	...	7.0	
Milk, 50 c.c.	1.5	2.0	2.5	
Tea or coffee				
	21.3	12.7	35.1	340 calories

Potatoes fried in mineral oil.

that 100 g. of a 5 per cent vegetable yield but 12 calories, and the inclusion of an extra portion, or omission of an undesired portion, is of little moment in the scheme as a whole. These foods need not be weighed.

The substitution of mineral oil for the edible oils in the preparation of mayonnaise supplies a very palatable addition to the salad, which is without food value. There is, of course, no objection to a dressing of tabasco, or pepper, salt, and vinegar, or lemon juice, or the addition of a small portion of Worcestershire or other sauce. The allowance of bread is perhaps somewhat small, but satisfies the craving of many patients. It may be remembered that baker's loaf and Vienna loaf are at least twice as bulky as an equal weight of the so-called home-made loaf. The amount of butter, 10 g., is often more than is required. A reduction of 2 g. makes it possible to use whole milk instead of skim milk for the tea and coffee. In the latter, small amounts of saccharin may be used with advantage, but the common mistake is to use too much. Desserts are in some cases omitted; in others, fresh fruits, and in others, diabetic desserts of low food value are suggested. The satiety value of an over-sweet dessert, preserved or candied fruits, honey, jelly or jam, should not be forgotten. It often contents the patient more than its additional calories endanger his result.

There is, of course, no objection to making the noon meal, or the evening meal, or both of them, a hot or a cold meal, and the luncheons may be substituted for the dinners if desired. Where fresh fish of suitable quality are available, a portion 50 per cent larger may be substituted

TABLE V.

APPROXIMATE CARBOHYDRATE CONTENT OF VEGETABLES AND FRUITS

5 Per Cent		*10 Per Cent*	*15 Per Cent*	*20 Per Cent*	*Non-nutrients*
Lettuce	Tomatoes	Onions	*Green peas	Potatoes	Broths
Cucumbers	Brussels sprouts	Squash	Artichokes	*Shell beans	Bouillon cubes
Spinach	Water cress	Turnip	Parsnips	*Green corn	Tea, coffee
Asparagus	Sea kale	Carrots	*Canned Lima beans	*Boiled rice	Cracked cocoa
Rhubarb	Cauliflower	Beets		*Baked beans	Mushrooms
Endive	Egg plant	Kohl-rabi		*Boiled macaroni	Salt, pepper
Marrow	Radishes	Pumpkin			Sage, spices
Sorrel	Leeks	*Canned green peas			Thrice boiled, 5 per cent vegetables
Sauerkraut	String beans	Okra			Agar jelly
Beet greens	Broccoli	*Soy beans			Mineral oil mayonnaise
Dandelion	Macedoine	Horse-radish			Iceland moss
Swiss chard		Catsup			Irish moss
Celery					
Unsweetened pickled vegetables					
Twice boiled carrots					
Twice boiled beets					
Twice boiled onions					
Twice boiled turnips					

				Measures
Ripe olives (contain 20 per cent fat)	Oranges	Apples	Plums	30 g. or c.c.—1 ounce
Grapefruit A.P.	Cranberries	Pears	*Bananas	1,000 g.—1 kilogram—2.2 lbs.
Lemons	Strawberries	Apricots	Prunes	1 calorie of heat raises the temperature of a litre of water 1 degree C.
	Blackberries	Blueberries		
	Gooseberries	Cherries		1 g. protein or carbohydrate yields 4 calories.
Reckon available carbohydrates in 5 per cent group as 3 per cent (3 g. of carbohydrates in 100 g. vegetables).	Peaches	Currants		1 g. fat yields 9 calories.
	Pineapple	Raspberries		
Carbohydrates in 10 per cent vegetables are reckoned as 6 g. per 100.	Watermelon	Huckleberries		
	Muskmelon			
The percentage of carbohydrates in fruits is as indicated in the table.	Twice boiled apples			
	Peaches canned in water			

Count clear soups and coffee substitutes as 1 g. carbohydrates per 100 c.c.
*Denotes foods with considerable protein or fat.

for the meat allowed, and the butter allowance increased by 5 g. (*cf.* Table VI).

Inspection of these diets discloses no outstanding deficiency in vitamins, with the possible exception of vitamin A, a supply of which, on account of previous storage, is probably present in the body in sufficient quantities to last for many weeks or even months. Table VI. shows the amount of calcium, phosphorus, and iron in the diet. As, contrary to figures usually quoted, we find that adults are commonly in calcium balance on diets containing 450 to 600 mg. of calcium there is no reason to increase the quantity. The phosphorus and iron are likewise normal, and additional quantities are unnecessary, except in the more prolonged reduction cures.

Except from the point of view of satiety, which is admittedly important, a very large protein intake is not desirable, unless the patient complains of weakness. As a rule, the high nitrogen excretion of under-nutrition soon decreases, and the larger part of the energy is derived from fat. When protein is being burned the water from the tissues destroyed helps to keep down thirst. When a bulky diet rich in inorganic salts is being consumed, and these foods are further flavoured with sodium chloride, there may be a tendency to thirst and water retention, which may mask the weight reduction. This is particularly to be noted in those persons instructed or allowed to exercise beyond the tolerance of an embarrassed circulatory system. Not only should the exercise be moderated or discontinued, but fluid and salt limitation, with possibly the use of a saline aperient in addition to digitalis, may be prescribed.

Judicious increase in exercise for the purpose of increasing the utilization of calories is a useful means of supplementing a dietetic regimen. It should be indulged in with caution, and subjected to gradual increase with increasing muscle fitness. Dyspnœa or excitement due to cardiac weakness, or often to the embarrassment of a heart overloaded with the labour of transporting excessive amounts of blood, and surrounded or pressed upon by fat, indicate a necessity for strict limitation of the duration of exercise. Overexhaustion without the signs of cardiac embarrass-

TABLE VI.

FISH: RAW, DRESSED, EDIBLE PORTION

Fish	*Protein*	*Fat*
Bass, black	20.6	1.7
Catfish	14.0	20.0
Cod	16.5	0.4
Flounder	14.0	0.6
Haddock	17.0	0.3
Halibut	18.6	5.2
Herring	19.3	7.1
Mackerel	18.7	7.1
Perch	19.0	4.0
Pike	17.9	0.8
Trout, brook	18.6	2.1
Trout, lake	17.6	8.1
Whitefish	22.9	6.5

FISH: PRESERVED, EDIBLE PORTION

Fish	*Protein*	*Fat*
Haddock, smoked	23.3	0.2
Halibut, smoked E.P.	20.7	15.0
Herring, smoked	36.9	15.8
Salmon, canned E.P.	21.8	12.1
Clams, fresh E.P.	10.6	1.1
Lobsters, fresh and canned	16.4	1.8
Oysters, solids, E.P.	6.0	1.3
Shrimps, canned	25.4	1.0
Turtle, fresh E.P.	19.8	0.1

Most fresh fish may be regarded as having 20 per cent of protein. The fat content of bass, cod, flounder, haddock, pike, and brook trout is low, average about 1 per cent. Other fish have from 4 - 20 per cent fat, average about 7 per cent.

TABLE VII.

CALCIUM PHOSPHORUS AND IRON CONTENT OF A DAY'S DIET IN GRAMS

	Ca.	*P.*	*Fe.*
Orange, 80 g.	0.036	0.0168	0.00016
Puffed rice, 15 g.	0.00134	0.0144	0.00014
Egg, one, 60 g.	0.04	0.108	0.0018
Back bacon, 25 g.	0.0044	0.0809	0.0011
Bread, 20 g.	0.0054	0.019	0.00018
Skimmed milk, 100 c.c.	0.122	0.096	0.00025
Butter, 7 g.	0.00105	0.0012	0.000014
	0.21019	0.3363	0.003644
Vegetable soup			
Roast lamb, 60 g.	0.0104	0.1940	0.0027
Vegetable, 10 per cent carrots, 130 g.	0.0728	0.0598	0.00078
Vegetable, 5 per cent spinach, 120 g.	0.0804	0.0816	0.00432
Vegetable salad, 5 per cent, 100 g., made up of			
Lettuce, 20 g.	0.0086	0.0084	0.00014
Tomatoes, 80 g.	0.0088	0.0021	0.00032
Bread, 20 g.	0.0054	0.019	0.00018
Butter, 10 g.	0.0015	0.0017	0.00002
Skimmed milk, 50 c.c.	0.061	0.048	0.00013
	0.2489	0.4146	0.00859
Consommé			
Roast beef, 60 g.	0.0104	0.1940	0.0027
Potato, 60 g.	0.0084	0.0035	0.00078
Vegetable, 5 per cent, asparagus, 150 g.	0.0375	0.0585	0.0015
Bread, 25 g.	0.0068	0.0233	0.00023
Butter, 8 g.	0.0012	0.0013	0.000016
Milk, 50 c.c.	0.061	0.048	0.00013
	0.1253	0.3286	0.005356
Day's totals	0.5844	1.0795	0.01759

ment may be counteracted by carbohydrate drinks, provided the total fluids are not excessively increased thereby. One thousand to 1,500 c.c. of liquid per day is adequate.

Light calisthenics, Swedish exercises, and bed exercises for those confined to bed, do little to increase the rate of weight loss, but are useful in keeping up muscle tone in preparation for future work. It is to be doubted, however, whether it is ever advisable to reduce those with marked limitations, especially if of prolonged duration, or if they occur in aged subjects. Massage has its greatest value if the patient performs it himself. Perhaps he does not rub off much fat, but, combined with an astringent cream, it serves a useful purpose in preventing the sagging, aged appearance of the face and neck. Applied to the abdomen, it probably has more effect in improving intestinal tonus and peristalsis as well as the tonus of the abdominal wall than in causing localized fat reduction. Removal of fat by surgical means has been practised by some surgeons, mostly in connection with other necessary operations. It is doubtful if the additional risk is ever justified, in view of the danger to the patient, and the strictly limited amount of fat that can be removed. This does not, of course, apply to circumscribed lipomata, which are, as a rule, not very amenable to non-operative measures.

It has long been noted that fat persons stand infections badly. During an under-nutrition cure, they lose none of their susceptibility. Indeed, the asthenic group are somewhat more liable to infection than usual. Particular care to avoid over-heating and subsequent chilling of the body, and isolation from people with colds, etc., is desirable at this time. A small dose (3-6 m.) of halibut liver oil with added viosterol seems a useful provision.

The use of thyroid in the treatment of obesity has received unnecessary condemnation from many sources. Doubtless much damage has been done by the misuse of this powerful drug by the laity. It is the active constituent of many patent remedies. However, it is not the only drug which has been misused in this manner, and its misuse furnishes no argument against the use of thyroid under professional supervision, with adequate safeguards. It may be freely

admitted that in most cases it is unnecessary, but in some instances apparently resistant to dietetic treatment, the human vegetables who cannot otherwise be stimulated to an adequate wastage of energy because they have so thoroughly acquired the habit of "letting George do it", a small dose of thyroid is useful. In those patients whose metabolism is definitely below the normal level a more definite indication for its use exists. Occasionally it may also be useful as a diuretic in patients whose weight loss has come to an end through an increased storage of water. This phenomenon, though but a temporary one, is the source of much discouragement to persons who have been dieting faithfully, and sometimes it will not respond to the more usual diuretics, or even salt and water limitation. Thyroid is both a direct and indirect metabolic stimulant. In the smaller dosage, its deleterious effects are most apt to be observed on an already overloaded circulatory system. Dosage which does not unduly raise the heart rate and basal metabolism (the two are not necessarily affected in a parallel degree) is safe.

As has been indicated before, speed is not a desirable attribute of a reduction cure. Excessively rapid loss of weight is only too often followed by a feeling of continued weakness and easy fatigability, which induces the patient to revert to his former habits of living, causes discouragement, and ultimately causes him to regain the poundage lost with such sacrifice. Time is an element in the cure of obesity—time to acquire the habit of consuming less calories—time to accustom the alimentary tract to a gradually shrunken bulk of food—time to increase gradually the intake of food to cover the normal working requirements of the individual without a storage of fat taking place. It would appear that standard dietaries in America to-day are definitely too high. They belong to a former day and not to the age of the machine. With the constant improvement in quality and palatability of foods the temptation to overeat is harder to resist, especially for those, who, whatever they may have persuaded themselves about the matter, have, nevertheless, enjoyed the pleasures of the table.

In prescribing a 1,000 calorie diet, the idea of fixation at this level may become too prominent. Such a system, however, lends itself easily to shrinkage by 10 to 20 per cent for the very short person, or a similar increase for the tall one. This may be accomplished by a general shrinkage or expansion, or by alteration in specific directions to meet, part way, the habits and tastes of the individual. It should be emphasized, however, that fixation at some level is imperative, that qualitative restriction in all but the least marked cases fails, and that the food scale is a better guide than the not wholly unprejudiced eye of the patient. As the patient gradually attains the objective, it is advisable to increase the food allowance gradually, rather than all at once, by successive additions of 10 per cent to the diet as outlined, or by satisfying the patient's desire for a particular food with the prescription of definite amounts. Patients markedly obese are better treated with a series of reduction cures interspersed with periods of more liberal, but, by no means, unlimited intake.

The final diet prescribed for maintenance may include the 1,000 calorie diet with such additions as the patient prefers. It may be estimated that most white collar jobs require less than 700 calories for a man (500 for a woman), above his basal caloric requirement. A journeyman today probably requires little more than 1,000 calories extra for his work. Those engaged in laborious occupations may require considerably more, according to the nature of the occupation, but these workers seldom become obese. Food habits are strong, and seasonal workers tend to regain their obesity in slack periods. A warning against excess food consumption at such times should be given.

APPENDIX

DIABETIC CUSTARD

1 cup (240 g.) milk	1 egg
Few grains salt	saccharin
½ teaspoon vanilla	

Method:—Beat the egg, and add flavouring, salt, saccharin and milk, which has been scalded. Pour into three custard cups. Set in a pan of hot water, and bake in a moderate oven. Custards are done when a knife inserted comes out clear.

Food value of each. P. 4.5, F. 5, C. 4.

Tea, coffee, mushrooms, beef extracts, bouillons, broths, consommé, Julienne, and mineral oil have no food value. A moderate quantity of lemon juice or vinegar with a dash of tabasco may be used.

Other soups except pea and bean, with vegetables, rice, barley or macaroni, may be counted as having 5 grams of carbohydrates per portion. Bean soup, pea soups, and clam chowder, 12 grams per portion.

Catsup, horse-radish, French mustard, sour pickles, 1 gram carbohydrates per portion.

By omitting 20 grams bread, may have 55 grams boiled potatoes and 6 grams more meat.

May substitute an equal amount of another cooked meat or 1½ times as much fresh raw fish.

May use half as much 10 per cent vegetables as 5 per cent or vice versa.

May substitute 20 grams ham or back bacon, V.F.R. and 6 grams butter for one egg, if desired.

By omitting bacon, and using skim milk, may have an egg.

May omit butter and take twice the amount of honey, jam, or marmalade.

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INDUCTION OF LABOUR BY RUPTURE OF THE MEMBRANES*

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ALL men who are doing obstetrics are interested in the induction of labour. The reasons for induction are many and will not be discussed here. The methods are also many and varied, and the results also are very often unsatisfactory. I am discussing for the moment medical induction, and it is probably fair to say that the general methods employed vary only in detail. Most men use castor oil, quinine, and divided doses of pituitrin in some form. I think that most have had the humiliating experience of admitting obstetrical patients to the hospital for the purpose of medical induction and have failed in their objective, even though the procedure be repeated. On the staff wards of the Vancouver General Hospital probably not a week goes by but that one or more patients are admitted for medical induction. All too often the time-honoured medication of oil, quinine and pituitrin has failed. I find in the summary of obstetrical cases for 1933 at the Vancouver General Hospital, including all admissions both private and public to the Department, the following under the heading,

INDUCTIONS

Medical	142	successful	96
Surgical	8	successful	7

The percentage of successful medical inductions is 67.1, or roughly two-thirds.

It is unfortunate that among these 142 cases we are not told for what purpose induction was thought necessary—how many were premature, how many full-term, and how many past term, how many were toxic, how many were done to cope with an emergency, and how many were done for the convenience of the physician? This information is not given, and so the figures *per se* are of little value, because, as I shall attempt to show, the success of the present method of medical inductions depends in large part upon the age of the fetus.

Now it has been recognized by all, I think, that medical inductions in full-term pregnancies are much more likely to prove successful than in those before full-term. Abortions at two or three months are almost universally unsuccessful, and the degree of success seems to improve in a direct ratio with the age of the fetus. I do not know how many times incomplete abortions have been admitted to the gynæcological service with a history of the fetus having been expelled but not the afterbirth. On our service it was practically routine treatment some years ago to give these patients graduated doses of pituitrin, 0.5 c.c. at half hourly intervals for five or six doses, in an attempt to have the patient empty her own uterus and so complete the abortion. I have long ago discontinued such treatment, because despite the extraordinary amount of pituitrin supposedly acting upon a relatively small uterus it was only the very occasional case that seemed to respond. As I shall attempt to show, the relation of infundibulin to uterine contractions is not so simple as that.

As we have already stated in a recent article before the Vancouver Medical Association the product of the posterior pituitary surely does become more active as regards uterine contractions, the nearer we approach full-term. An explanation of this has been provided in recent years with an increasing knowledge of the hormones of the ovaries and pituitary bodies. It seems to be an established fact that the presence of œstrin, primarily the hormone of the follicle, is necessary in quantity before any product of the posterior pituitary can act. Œstrin progressively increases in the circulation during pregnancy and is at its height at the beginning of labour. This is an established biological fact. Progestin, the hormone of the corpus luteum which definitely inhibits uterine contractions, is found in greatest quantity at the time of implantation, and thereafter gradually decreases, until nearing term it is almost absent. This also is no longer a theory but an established fact. And so I think we must agree that induction of labour in the premature with pituitrin in any

* Presented at a general staff meeting, Vancouver General Hospital, March, 1935.

form has no scientific foundation. Let us consider the hormonal balance in the circulation during the early months of pregnancy. Progestin, the inhibitor of uterine contractions, is markedly predominating; œstrin, the sensitizer of uterine muscle and activator of pituitary activity, is very much in the minority. It seems reasonable then that any quantity of pituitary added to the circulation is quite unlikely to cause uterine contractions.

The matter of medical induction at full-term by pituitrin should also be considered. I believe that it is successful in the majority of cases that are full-term. But what is full-term? Is it 280 days after the first day of the last period. Experience has taught us that no such arbitrary rule is exact. The figure is approximate only. We all know that if we prophesy the exact due date once or twice in ten times we are fortunate. The fact is, we cannot prophesy full-term because we cannot define full-term, nor have we any sound reason for demanding that labour shall immediately succeed our full-term as we define it. If what I have offered has any modicum of fact let us examine the factors that would seem to be necessary before the phenomenon of labour can be precipitated. These are:— (1) The presence of œstrin in sufficient quantity to (*a*) sensitize the uterine fibres and (*b*) call forth enough infundibulin to cause contractions. (2) The absence of progestin, enough that the contractions be not inhibited. (3) Enough infundibulin must be brought into the circulation by œstrin to promote labour contractions. (4) Adrenalin and acetylcholin must be present, to permit sympathetic and parasympathetic fibres to act. At present we simply add an extra quantity to the hormone infundibulin and expect that all the other factors shall in some way be added unto us.

In view of the unsatisfactory results obtained with the present method of medical induction, and in view of the argument presented above, our attention was perhaps naturally attracted to the method of induction by a rupture of the membranes. Articles have been appearing more and more frequently in the literature during the past few years on this subject. I know there will be a good deal of protest from many or most of you, and I do not pretend to champion the method as routine. I do believe however that the procedure has a very definite place in our obstetric armament. I believe that much of the supposed risk which has been attached to dry labour is without much foundation. I believe, too, that a free discussion of such procedure among matured men, not students, should be of some value to all of us.

Many questions naturally suggest themselves. 1. Is the bag of waters, so vital for gestation, essential for the progress of labour? We know, of course, that the bag of waters is not essential. All things being equal, the early rupture of the membranes offers no impediment to the progress of labour. Kries, of Strasbourg, a pioneer in this work, makes the observation, which all of us will confirm, that very often a head riding high in the brim will engage properly after rupture of the membranes, with a resulting speedy termination of labour. He suggests that "the forewaters, so important to cervical dilation in theory, are in fact seldom present, and when they are present may well be considered to cause a dystocia at times."

2. Does the absence of the waters, the so-called "dry labour", impede the progress of labour? A large number of cases appearing in the literature and rapidly increasing in number, which are properly controlled, seemed to give us the answer. The absence of the waters does not impede the progress of labour; on the contrary, labour is shortened rather than prolonged.

3. Is the bag of waters a protective mechanism against infection during the progress of labour? I shall not suggest that the old teaching that the bag of waters is protective is a fallacy. I can say that in the large groups of cases of others and in our tiny experience morbidity rates do not seem to be any higher. Maternal mortality rates also are apparently not increased in cases of dry labour.

4. Is the direct contact of the presenting part with the lower uterine segment of the uterus injurious to the cervix? I can only report that Kries and others have made macroscopic and microscopic studies of the cervix after dry labour and find nothing to contraindicate early rupture of the membranes.

5. Is dry labour injurious to the child? Infant mortality has not increased, and infant morbidity, from the standpoint of immediate physical injuries, is not apparently increased. Ultimate morbidity, as physical or mental disability, cannot be discussed as yet. It is

interesting, however, to note that the use of instrumentation seems to be lessened in the delivery of dry labour.

6. Why does the rupture of the membranes at so-called full-term induce labour? It would perhaps seem at first thought that the contraction of the uterine muscle about the irregular, firm fetal ovoid, together with added pressure on the internal os, provide the necessary muscle stimulation to produce the phenomenon of labour. This apparently happens when a bag is used. I think that both physiological and clinical observations will assure us that the explanation is not so obvious. Let us again examine those hormonal factors apparently necessary before labour can be produced. I think we have grasped the fact that œstrin is by far the chief vital factor in connection with the phenomenon, and not infundibulin, as we have apparently believed in the past. Now œstrin is manufactured and produced in quantities in the placenta. Indeed the commercial product emmenin, carrying chiefly the œstrogenic factor, is recovered from the placenta. I submit that when the waters are drained away there is a resulting reaction upon the placenta causing immediate increase in the circulation of the hormone œstrin. Inhibiting factors are thus overcome, the uterine muscle becomes sensitized, infundibulin is called into the circulation and the phenomenon of labour is instituted. I think it should be again pointed out that that elusive chemical agent acetylcholin is formed in the human placenta. May I recall again that this substance is essential for the transmission of stimuli from the parasympathetic nerve to the longitudinal or expulsive muscle coat of the uterus. I wonder if this substance is formed only late in pregnancy, because it seems to me that expulsive contractions are so often absent in the labour of early pregnancy.

7. Is the rupture of the membranes a successful method of induction before full-term? We need not define again our conception of full-term. Suffice it to say that in my own opinion it is chiefly if not altogether a matter of hormonal balance.

We have found in our small series of ruptured membranes that the earlier labour is induced, the less satisfactory are the results obtained by rupture of the membranes. Rupture of the membranes at seven or seven and a half months results in a longer period elapsing before labour sets in than at so-called full-term. Indeed, the sluggishness of the onset of labour after the rupture of the membranes seems to be in a direct ratio with the prematurity. We have been given access to the record of a case of therapeutic abortion at six months. The membranes ruptured and a goodly quantity of fluid drained away; labour did not set in. The patient was given oil, quinine and pituitrin at intervals on succeeding days, but there were no labour pains until five full days had elapsed. She emptied her uterus with some help the next day, a total of six full days after the rupture of the membranes.

It is a common clinical experience that therapeutic abortion cannot be produced with pituitrin in the early months. If our hypothesis is of any value it must apply here also. The circulation at this time is flooded with anterior pituitary and corpus luteum hormones, both inhibitors of uterine contractions. The œstrin present is formed only by the follicles, as little or no placental tissue has been formed. As a result there is no uterine sensitivity, and the pituitrin which is artificially added will not satisfactorily act because of the presence of only a minimal quantity of œstrin.

We have believed for some time that in pre-eclamptic toxæmia and eclampsia artificial rupture of the membranes is a useful procedure. We believe it useful whether the patient be at full-term or somewhat premature, as these patients so often are. You will note in our small series one case of eclampsia and five of pre-eclamptic toxæmia. Three were staff patients, three private patients, admitted to this hospital last autumn. In all six cases labour was induced and completed without incident. There were no fits, either during labour or after. The drainage of the amniotic fluid relieves pressure, improves the respiratory excursion, probably of very real benefit to the patient, and seems to lessen the toxicity, as the patients felt better and headaches were lessened. In one case there seemed to be an increase in urinary output. The procedure might very conceivably be considered to smack of the radical, especially in view of the fact that conservatism to the nth degree is the keynote in treatment of the eclamptic. It was then with real pleasure and surprise that I came on an article a few weeks ago[1] by Stroganoff, of

Leningrad, the originator and high priest of the conservative treatment of eclampsia. He reports rupture of the membranes in eclampsia and quotes 86 cases. He is agreeably surprised that delivery is so markedly accelerated, and that the increased contractions caused fewer convulsions instead of more as he had anticipated. He emphasizes lessened intrauterine pressure, lessened abdominal pressure, with resultant improved intraabdominal circulation and increased excursion of diaphragm, with increased oxidation of the blood, which he considers very important. He also speaks of the absorption of toxic liquor amnii into the maternal circulation being reduced. (To this last hypothesis I do not subscribe.) And so it is with much greater confidence that I present the suggestion that the membranes should be ruptured in those toxic cases where eclampsia is either present or imminent.

From what has been said it might be thought that the object of this study is to discard the old method of induction, even to ridicule it, and to replace it with a new method based on hormonal balance. It seems to me that the oil, quinine and pituitrin method now in vogue has little or no basis on scientific fact. Nevertheless, at or about full-term it works in a majority of cases. To induce labour on the hormonal theory it should only be necessary to supply sufficient œstrin to sensitize the uterine fibres enough, and to call out enough infundibulin, and labour is accomplished. Unfortunately, such is not the case, in actual experiment. Following the theory of œstrin deficiency as the cause of induction failures, a number of workers have been experimenting in England and Germany, and their findings are appearing occasionally in the literature. Their results are on the whole disappointing up to date. Bourne[2] reported an attempt at induction in 6 women, all presenting apparently normal pregnancies, one at 36 weeks, 3 at 37 weeks, 1 at 38 weeks, and 1 at 40 weeks. All received œstrin in tremendous quantity, from 1,000,000 to 5,000,000 int. units. In two cases varied, but altogether adequate, quantities of pitocin were also given and labour was not induced in any case. Not only was labour not induced, but there was a complete absence of any reaction. To me this by no means waives the theory. It simply means that, so far, only part of the story has been told. In the meantime we as clinicians should not sit back and wait for the ultimate answer in some laboratory animal or test tube, but should use our powers of observation and try in every possible way to add something to the rather meagre sum total of present day knowledge.

SUMMARY

This subject is brought forward for a number of reasons:—

1. To point out that rupture of the membranes has a place in our obstetrical armament as a means of the induction of labour.
2. That "dry labour" is not in reality the bugbear it was once considered.
3. That rupture of the membranes probably has a very real place in the treatment of eclamptic toxæmia.
4. That the present day method of medical induction, though without any scientific basis that I know of, is the only medical induction yet known.
5. A sketch of the hormonal balance theory is offered, to show the modern trend in the quest for a solution to the illusive phenomenon of labour.

CONCLUSION

We believe then that artificial rupture of the membranes has a place in the practice of obstetrics. We believe that it is the surest method of inducing labour at full-term. We believe that its risks are not so great as we have hitherto been led to believe. And, finally, this discussion is not offered in order to uphold rupture of the membranes as a routine method of induction, but rather to offer some support to the manœuvre, and with it a hypothesis that may lead to profitable discussion.

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ON THE ADMINISTRATION OF IRON

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IN the days when chlorosis in young girls was common the administration of iron often produced rapid and evident cures. This naturally led physicians to regard iron as a sovereign "tonic", and led in days when diagnosis was less precise and pharmacological thinking less accurate to iron being regarded as a valuable "tonic" for any patient whose health was below par. Today we realize that this conception is not accurate. In some anæmias iron is of little or no value, but in others its effects are striking. Nor is there any evidence that iron has a general "tonic" action.

Iron is useful in any anæmia in which the amount of iron stored in the spleen, liver and bone marrow for the production of hæmoglobin is small or absent. This in turn depends on either lack of available iron in the food, owing to a faulty diet or an abnormal digestive process, particularly a lack of hydrochloric acid, leading to less iron being made available for absorption from the iron in the food. In these anæmias there usually is a decrease in the red blood cells, but more conspicuously a decrease in their content of iron, so that the hæmoglobin content falls and with it the colour index. These anæmias are hypochromatic, *i.e.*, with a low colour index.

The anæmias of this general type may be classified as follows: (1) The nutritional anæmia of young children. The main trouble is too little iron in the diet. Cow's milk, as compared to human milk, is poor in iron. Even human milk may not contain adequate iron, particularly if there are twins, or if breast feeding is continued too long, or if the mother is not absorbing adequate amounts of iron. This condition of nutritional anæmia can readily be produced in young animals, rats for instance, by putting them on an iron-poor diet, and has served as a useful experimental means of studying the absorption and utilization of iron. (2) The old chlorosis, which seems to have disappeared with the abandonment of the corset. (3) The so-called late chlorosis, idiopathic hypochromic anæmia, usually occurring in women after pregnancy. During pregnancy a slight degree of anæmia is common in the later months, probably owing to the utilization of iron by the fetus. In normal women after parturition recovery to a normal blood picture is usually rapid, but if iron absorption is not normal in amount owing to the diet or disorders of digestion, and particularly if there is much loss of blood during parturition or during menstruation, the anæmia persists and develops. A large proportion of these cases show lack of hydrochloric acid in the stomach, and in others the acid is deficient in amount (hence the group of simple achlorhydric anæmia).

An addition of iron may be of value in the case of a great loss of blood or in the case of pregnant women when the iron requirement is high, and also in some cases of pernicious anæmia which do not recover on liver alone.

We are now forced to the belief that only iron in the ferrous state is absorbed by the intestine. This belief is based upon a mass of experimental evidence, of which one of the most striking examples is due to Lintzel. A new and interesting chemical, *a-a*-dipyridyl, was found to form a compound with ferrous salts, which is so stable that the iron cannot be liberated in the digestive tract. This compound with ferrous iron is intensely red. *a-a*-dipyridyl does not react at all with ferric salts and is itself not harmful. If now young rats are fed a diet containing adequate amounts of iron and also *a-a*-dipyridyl, any iron which is liberated in a ferrous form becomes unabsorbable. The animals rapidly become anæmic. Even if they are given large amounts of ferric salts in their diet they still become anæmic. Evidently ferric iron cannot be absorbed.

If now we look at the ordinary iron salts used in medicine, we will see that the Solution or the Tincture of Iron Perchloride, as it contains only ferric iron, should yield no iron to

the body. Fortunately, among our foods certain reducing substances occur, which if they happen to come into contact with ferric chloride in solution will reduce it to ferrous chloride, thus making some of the iron given available. But ferric chloride and other readily soluble ferric salts unfortunately combine very readily with proteins and produce a precipitate. This is why ferric chloride is used as a styptic. Such precipitated iron cannot be reduced to the ferrous state and is lost, since even if the protein portion of the compound is digested away, the compound will have passed into the alkaline portion of the gut where any iron is precipitated as carbonates, phosphates or sulphides which cannot be absorbed by the mucosa of the gut.

Iron and Ammonium Citrate and the other scale salts of iron contain the iron in a completely unavailable form until they have been acted upon by hydrochloric acid or some of the other acids that occur in the stomach. The effect of hydrochloric acid is to liberate ferric chloride from the scale salt. The ferric chloride may suffer one of two fates. Either it reacts with proteins producing a precipitate and is lost; or if it comes into contact with the reducing substances of the food ferrous chloride is formed, is available, and no longer reacts with the protein. The other gastric acids will produce corresponding changes in the scale salts. The Solution of Iron Perchloride (chemically, Ferric chloride), is irritant to the stomach, owing probably to its reacting with the proteins of the stomach wall. The scale salts are not irritant, because only slowly will the gastric acids liberate ferric chloride and much of this will react with protein. Scale salts are fortunately given in solution, as this favours their distribution over a wide area and thus increases their chance of reacting with gastric acids and reducing substances, but this also increases the chances of the ferric salts formed reacting with protein and being lost.

Reduced Iron is not in the ferrous form, but is pure iron, with perhaps a little ferric oxide. It is insoluble and not available until the gastric acids dissolve it. With hydrochloric acid it forms only ferrous chloride; no ferric chloride can be formed as long as there is any reduced iron present. The more dilute the hydrochloric acid present the more slowly solution occurs, and if there is little reduced iron present very little ferrous chloride is formed. This is even truer of the other gastric acids. Consequently, large doses of reduced iron must be given and it must be as widely distributed as possible throughout the stomach. The iron must not lie in a mass, but be distributed so that it presents as great a surface as possible to the dissolving acids.

Iron Sulphate is ferrous sulphate, and as such does not react with protein; consequently its dose is low. It does not appear to be quite so available for absorption as ferrous chloride. Blaud's Pill and the former Mistura Ferri contain ferrous carbonate, which is insoluble and unavailable until the gastric acids change it into a soluble form. The useful dose of Blaud's Pill is large, much larger than that ordinarily given.

The iron in most foods is not readily available. The best sources are egg-yolk, milk, spinach and cabbage, and probably other leafy vegetables. It has long been known from both clinical and experimental evidence that very little iron is made available by the digestive processes from hæmoglobin. Hæmoglobin should never be given as a source of iron.

That some of the iron in food or in scale salts or inorganic iron salts is converted into the ferrous form, has been shown by testing the stomach contents with *a-a*-dipyridyl. These ferrous salts may be absorbed by the stomach wall, and are certainly absorbed by the duodenum and upper jejunum, where the gut content is still acid. As the gut content becomes alkaline, ferrous salts are precipitated as carbonates, phosphates, and eventually as sulphides. It occasionally happens that undue amounts of ferrous salts pass into the gut and then the first symptom of an undue amount of ferrous absorption becomes evident in the form of diarrhœa. The dose of iron should be reduced.

The richer the body is in iron, the less the amount of iron taken up daily. Very anæmic patients take up relatively large amounts of iron and convert it into hæmoglobin. Indeed, a mathematical analysis of published clinical cases clearly substantiates the above picture of the fate of administered iron. We will quote but one or two clinical examples as illustration of the above statements.

Minot and Murphy have shown that in females there is on an average 42.5 mg. of iron per 100 c.c. of blood contained in its hæmoglobin. A woman, then, of 120 lbs. will have about 4.2 litres of blood, and this will contain 1,800 mg. of iron and a hæmoglobin value of 100.

(*a*) A case of anæmia with 29 per cent hæmoglobin and 3 million reds would then have about 29 per cent of 1,800 mg. or 522 mg. of iron. When this patient was put on iron medication she had at the end of twenty-eight days a hæmoglobin value of 71 per cent, or about 1,278 mg. of iron, an increase of 756, or about 27 mg. per diem of iron converted into hæmoglobin. This rate of absorption would not continue.

(*b*) In a typical case of hypochromic anæmia reported by Hare, the erythrocytes were 5.5 millions; hæmoglobin 44 per cent, colour index 0.4; total calculated hæmoglobin iron 792 mg. After nineteen days of large doses of iron the erythrocytes were 5.8 millions; hæmoglobin 58 per cent; calculated hæmoglobin iron 1,044; increase 252 mg. in nineteen days, or a daily conversion of iron to hæmoglobin of 13 mg. During a further period of four months, by a similar calculation, there was an average conversion of 6 mg. of iron to hæmoglobin per diem, and during a further three months of 1.5 mg., when the patient had 5.65 millions erythrocytes, hæmoglobin 106 per cent, and a colour index of 0.94. This case shows clearly that on large doses of iron at first large amounts are built up into hæmoglobin, but the amount of iron metabolized gradually decreases.

(*c*) In a case reported by Reimann and Reisch, a patient with some gastric hydrochloric acid had 3.6 millions of erythrocytes, hæmoglobin 36 per cent, calculated hæmoglobin iron 648 mg. On reduced iron, 1.5 gr. per diem, her hæmoglobin value actually fell. On relatively small doses of another iron preparation for sixteen days there was a daily conversion of about 7 mg. of iron to hæmoglobin and the hæmoglobin content of the blood rose 42 per cent. When, however, the patient was put on ferrous chloride, 1.5 gr. per diem for eight days, the hæmoglobin rose rapidly to 70 per cent and the conversion of iron to hæmoglobin was 63 mg. per diem, and she showed also a marked increase in reticulocytes. This case makes it evident that small doses of reduced iron are of little value, as even when hydrochloric acid is present, as in this case, but little ferrous chloride can be formed. The numerous reduced iron tablets sold by manufacturing houses, which contain 1 gr. only of reduced iron, are almost if not quite valueless. Yet one firm lists three such tablets, each of which contains 1/120-1/60 of a grain of strychnine. No adequate dose of iron could be given in the form of these tablets without producing strychnine poisoning. Further, tablets are as a rule a poor form in which to administer iron, as they do not present as large a surface as a powder. Scale salts or Blaud's Pill in minimum pharmacopœial doses are also of little value, as again but little ferrous chloride available for absorption will be formed.

These cases illustrate typical results of iron medication. Ferrous chloride, as contained in the Syrupus Ferri Chloridi C.F. (though the dose in the C.F. may be doubled), appears to surpass all other preparations of iron. One to 3 grains of iron, or 2.5 to 7.5 gr. of ferrous chloride, in this form appear to equal some 6 to 10 gr. of ferrous sulphate, some 30 to 50 grains of reduced iron, or 60 to 90 grains of the Iron and Ammonium Citrate, and about the same amount of Blaud's Pill. Not much iron is required per diem for blood building, but this amount must reach the gut in an available form. Further, the greater the need for iron, the faster it will be taken up and made into hæmoglobin, if furnished in an available form.

Iron given by intramuscular injection is almost valueless. The Iron and Ammonium Citrate or an Iron Citrate is usually employed. An ampoule contains usually only ½ to ¾ grain of scale salt, more rarely 1½ grains; about one-fifth this amount is iron, *i.e.*, about 1/3 gr. or 20 mg. of iron in the latter case. Lintzel has shown that by no means all of such iron can be utilized by the body, a large part of it being rapidly excreted. Such injections are usually given every three days, or even weekly. Consequently this mode of administration, as compared with the oral route, is inefficient and unduly expensive, and should not be employed save perhaps in rare cases.

Copper is today a very favourite addition to the proprietary iron combination. Yet the evidence for its value is small. It is true that

if adequate copper is not absorbed by growing rats, an anæmia develops which iron alone will not cure, though minute amounts of copper will do so. Inadequate copper absorption may occur in young children, but usually the food contains adequate copper, and most iron preparations contain adequate copper as an impurity. The addition of small amounts of copper will not do any harm, but will very rarely do good. The important thing in treating an anæmia which requires iron is to give plenty of it. In this the ordinary proprietary conspicuously fails. Many proprietaries alleged to contain iron do so in such small amounts and often in such unavailable forms as to be completely valueless. The physician who has a case of anæmia requiring iron would be wise to employ either the mixtures of the C.F. or Reduced Iron in powder form or in cachet. A cachet, properly moistened, which contains 20 grains of reduced iron will be swallowed by most patients more readily than a capsule containing 10 grains and will dissolve more quickly.

One of us (G.H.W.L.) has recently observed that if vegetables are cooked in the modern heavy iron pots, either without additional water or as little as possible, there is a very marked increase in the iron content of the ash of the vegetables. This increase ranged from 10 to 40 times the amount in the original vegetables. For example, string beans increased from 0.43 mg. per 100 grams to 17.5; carrots from 0.97 to 9.5; cabbage from 0.72 to 9.6; spinach from 6.23 to 57.0. Further, such additional iron appears to be in an inorganic form. Consequently if vegetables are cooked in this way a considerable increase in iron may be expected, and probably such iron is as available as the iron in the vegetable itself.

IS CARDIOVASCULAR-RENAL DISEASE INCREASING AS A CAUSE OF DEATH IN CANADA?*

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REPEATEDLY in both medical and lay conversations and writings do we find reference to the "tremendous increase in heart disease". Occasionally we see comments in medical literature to the effect that there is no increase in heart disease, and that the apparent increase is due to the fact that more people are living to old age and that heart disease is primarily a disease of later life. Again we hear that the apparent increase is due to the much better diagnosis today. Many deaths were attributed to senility in earlier times when they should have been listed as due to heart disease. If these two factors, better diagnosis and longer life, be taken into account, say this second group, we find that there is no real increase in heart disease today over earlier years. Such a question can be settled, even partially, only by strict analysis of figures and by most careful interpretation of results.

The first question to be settled is, of course, "Is there an increase in heart disease?" The second is, "To what is this increase, if any, due?" Now I propose to make an attempt to answer the first question, and to offer an interpretation of the results, so that a suggested answer for the second is forthcoming. I shall select Canada as the place for my study, and shall analyse its data from 1901 to 1931.

BETTER DIAGNOSIS AS A FACTOR IN CAUSING THE INCREASE

First let us consider the matter of better diagnosis. It is undoubtedly true that far more deaths were attributed to senility in 1901 than in 1931 in Canada, and that many of these so-called deaths from senility were really due to heart disease. The Bolduans,[1] in New York, have estimated that half of them can legitimately be said to have been due to heart disease. That means that practitioners of today are giving some type of heart or vascular disease as a cause

* Read before the Toronto Academy of Medicine, November 6, 1934.

of death where formerly they assigned the death to "senility". Hence many of the deaths from heart disease today that help to swell the figures do not represent a real increase. Now we will compensate for that lack of accurate diagnosis in 1901 by taking one-half of the deaths attributed to senility then and adding them to our group of cardiovascular disease cases, and we will do the same for all the years whose data we use. Hence we will be making up in large measure for inaccurate diagnosis then as well as now. In the rest of the discussion, when we speak of deaths from cardiovascular disease, it should be remembered that we are including not only the listed deaths but many that were not accurately diagnosed.

There is a second way in which better diagnosis might affect the death rates and we will compensate for it in the following manner. If a man with myocarditis died with chronic nephritis to what category would his death belong? If, in 1901 the tendency was to emphasize the kidneys as the primary cause of death, and in 1931 if the emphasis had shifted so that the death was listed as due to heart disease, then there would be an apparent increase in heart disease, although the proportion of persons dying of cardiorenal disease would have been the same. Again following the suggestion of Bolduan, we will not study the mortality from heart disease alone, but from a group of diseases which includes all the diseases of the heart, arteries and veins, apoplexy (which should be listed under diseases of the circulatory system in place of the nervous system where it now is) and chronic nephritis, which so often has its basis in vascular changes in the kidney. This great group we will call cardiovascular-renal disease, and will designate it for the sake of brevity as CVR disease throughout the discussion. To this will be added one-half the senility deaths, and in this manner we will have compensated to a large measure for inaccurate diagnosis and for shifting emphasis in assigning the cause of death, and will have a fairly accurate basis for comparison of the two years, 1901 and 1931.

It is true that there will still be room for maintaining that diagnosis is better today than formerly. If we consider what the diseases of middle life and old age are which might have been CVR disease and were not so diagnosed, we find that there are very few categories apart from cancer and senility in which a practitioner of thirty years ago would have been apt to place a case of CVR disease. The senility group we have taken into consideration, and as cancer also is increasing as well as CVR disease we can assume that the increase in CVR disease is not to any great extent due to a falling off in the cancer group.

CHANGE OF AGE IN POPULATION AS A FACTOR IN CAUSING INCREASE

Now let us turn to the question of age of population as a possible explanation of the increase in CVR disease. It is true that there are far more persons in Canada today than in 1901, so that there are more persons to die of CVR disease. Not only that, but the proportion of old people is higher today than in 1901. As a matter of fact, 76 per cent of our population were under 40 in 1901, and 71 per cent under 40 in 1931, so that 5 per cent more of the people are now in the age group in which CVR disease is most common. Hence many of the deaths from CVR disease that seem to be indicative of an increase are merely due to there being many more old people. Can we make allowance for this factor as we did for the matter of better diagnosis? We can, and in two ways. One is to divide the population into different age groups and to ascertain the death rate for each age group in 1901 and 1931. If the proportion remains the same, then there is no increase in the death rate, although the total death rate will be higher in the latter year, because of the age-shift of the population. The second way is to calculate just how many deaths would have occurred in 1931 had the same percentage in each age group died as died in 1901. By adding these figures, we get the total number of deaths from which can be calculated the death rate for 1931 were there no actual increase in the deaths from CVR disease. These two methods adequately compensate for any age change in the population.

PERCENTAGE OF TOTAL DEATHS CAUSED BY CVR DISEASE

Now there remains one more matter to be understood before we can start on an analysis of the figures. It is a very important matter and one not always clearly defined by those who talk of increase and decrease in deaths from a disease. There are two ways of determining increase or

decrease in deaths from any disease, and the two ways must be used in conjunction if we are to arrive at a safe conclusion. One way is by means of the death rate, which gives the number of persons per 100,000 of living persons who succumb to any disease in any year. Thus if 100 persons die of diabetes out of every 100,000 living, the death rate from diabetes is 100. Now the curious thing about the death rate is that it is influenced not only by the number of deaths from disease but also by the number of births which are occurring. If there was an epidemic of quintuplets in Canada in a certain year, so that the birth rate rose unduly, the death rates from cancer, from diabetes, and from CVR disease, which are primarily diseases of old age, would fall, not because there were fewer old people dying of them in that year but because the living population had suddenly been increased by a number of persons who were not susceptible to the diseases in question. So when we study a death rate and find it falling, we cannot necessarily say that the disease is decreasing, any more than we can say that when the death rate rises the disease is increasing. We have to study the death rate in connection with a second factor which we will now mention, namely, the importance of the disease as a cause of death, its importance being based upon the percentage of total deaths for which it is responsible.

Let us take an example. Suppose that there are 100,000 persons in Canada. Of that number, 100 died in one year: 20 died from tuberculosis, 20 from CVR disease, 10 from cancer and 50 from acute infectious diseases. The death rates from the above diseases would then be 20, 20, 10 and 50, respectively. At the beginning of the next year 100 babies were born to replace the 100 persons who had died, so that the population was still 100,000. Due to preventive medicine many of the infectious diseases were eliminated, so that instead of fifty there were but ten deaths from that cause in the second year. The total death rate would then have fallen from 100 to 60; the acute infectious disease death rate would have fallen from 50 to 10, and the death rate from the remaining three diseases would have stayed the same. But as a cause of death, tuberculosis, CVR disease and cancer would materially have increased. In the first year they were responsible for one-fifth, one-fifth and one-tenth of the death rate, respectively; in the second year they would be responsible for one-third, one-third and one-sixth of the deaths without any increase whatever in their death rates. The death rate from CVR disease might even have dropped in the second year from 20 to 15, but in spite of that it still would have increased as a cause of death, for it would have caused one-fifth of the deaths in the first year and one-fourth of the deaths in the second. On the other hand, as might be shown by similar examples, the death rate from a disease might be rising, but its importance as a cause of death might be falling, due for example to the presence of a great influenza epidemic.

Death rates by themselves are not enough to tell us the mortality trends from a disease. We need to know in addition the percentage of total deaths caused by that disease. When the total death rate falls, as it has done steadily in civilized countries for years, that does not mean that fewer people will ultimately have to die. It merely means that the day of death is post-

TABLE I.

MALE DEATH RATES FROM CVR DISEASE FOR CANADA, FOR 1901, 1921 AND 1931, BASED UPON THE NUMBER OF THE POPULATION IN THE CORRESPONDING AGE GROUPS

10	*10-19*	*20-29*	*30-39*	*40-49*	*50-59*	*60-69*	*70-79*	*Over 80*	*Total*	*Year*
21	22	34	55	112	283	743	2,500	4,860	184	1901
14	11	27	42	96	305	979	3,260	7,745	215	1921
6	12	20	45	130	393	1,150	3,272	8,540	257	1931

FEMALE DEATH RATES FROM CVR DISEASE FOR CANADA, FOR 1901, 1921 AND 1931, BASED UPON THE NUMBER OF THE POPULATION IN THE CORRESPONDING AGE GROUPS

10	*10-19*	*20-29*	*30-39*	*40-49*	*50-59*	*60-69*	*70-79*	*Over 80*	*Total*	*Year*
20	25	43	78	135	265	638	2,340	4,717	179	1901
7	13	19	42	110	290	909	2,905	7,728	210	1921
6	13	27	59	127	338	1,032	3,064	8,502	256	1931

poned. In the illustration just cited, the public would not have been justified in thinking that CVR disease was lessening in the community because its death rate had declined from 20 to 15, for as a matter of fact more persons would have died from CVR disease than formerly, although they may have lived a few years longer than formerly before they succumbed. If all other causes of death were eliminated, then CVR disease would be the only cause left, and no matter how low its death rate might fall it would be of paramount importance, since 100 per cent of deaths would be caused by it. How futile then would be the encouraging statements of the medical profession or statisticians to the public that CVR disease was not increasing because its death rate had fallen, when as a matter of fact there was no other cause of death

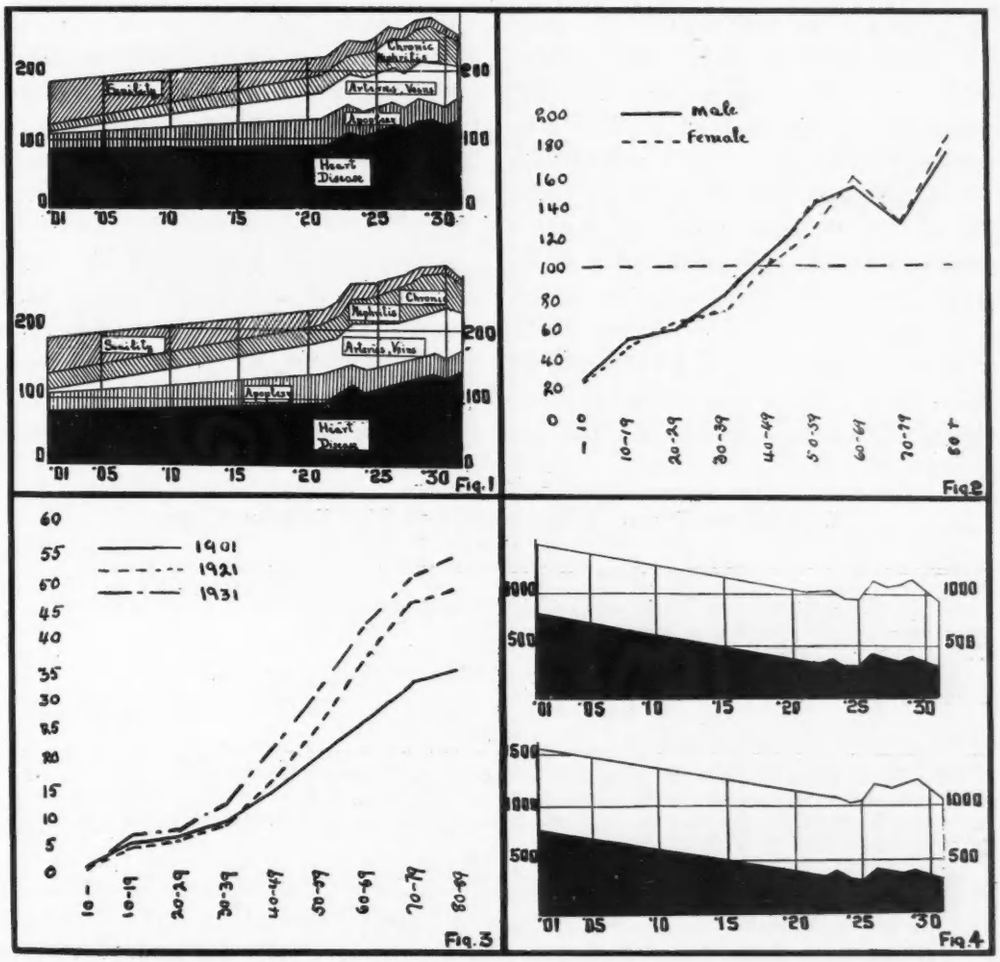

Fig. 1.—Death rates from cardiovascular-renal disease and from its components in Canada from 1921 to 1931. Vital statistics were not available from 1901 to 1921. The top line represents the total CVR death rate, the vertical height of each section, the death rate from that component of CVR disease. Note that the senility rate has dropped; all the rest have increased. Despite the fact that the addition of half the senility deaths to compensate for better diagnosis in later years has materially reduced the amount of increase in CVR deaths it has by no means obliterated it. The upper figure is for female death rates, the lower for male. **Fig. 2.**—Comparison between CVR death rates for males ———— and females - - - - for all Canada of years 1901 and 1931. The 1901 rate was considered as 100 and the 1931 rates computed on that basis. In both sexes there were fewer deaths in young persons, more deaths in old in 1931. Data on which the curve is constructed are in Table I. **Fig. 3.**—Curves showing the increase in importance of CVR disease as a cause of death in Canada for the different age groups shown along the abscissa. The percentages are shown on the ordinate. See Table III for data. **Fig. 4.**—Curve showing the fall in total death rates and death rates from infectious diseases in Canada from 1901 to 1931. The top line represents total death rate, the black area, infectious disease death rate, the white area, the death rates from all other diseases apart from infectious diseases. Note that the fall in the total death rate has been practically entirely due to the fall in infectious disease death rate, so that other diseases which formed about 50 per cent of the total in 1901 form about 70 per cent of the total in 1931. Top figure gives female, the lower, male death rate.

left. *Hence it is possible for the death rate from a given disease to remain stationary or even to fall while the disease itself is actually increasing in importance as a cause of death.*

With this preliminary explanation of some of the pitfalls lurking in statistics, of some of the difficulties in the interpretation of data, and of the care which must be exercised before one can pronounce any final judgment upon this apparently easy, but really intricate, problem of increase in a disease, we will turn to the data for Canada. Vital statistics and census reports giving the age of the population are available for the years 1901, 1921 and 1931. For our purpose the population was divided into age groups of ten years each. The CVR death rates for each decade of life, based upon the number of persons living in that age group, were computed for the years 1901, 1921 and 1931. To these deaths actually recorded as due to CVR disease were of course added one-half of the deaths from senility for the year. Any increase in CVR death rate in these various age groups could have only one significance, of course, that in proportion to the population in that age group more persons were dying of CVR disease than had died formerly. Moreover, the percentage of total deaths in any age group which was caused by CVR deaths was computed for each of the three years, so that a true picture of mortality trends was obtained.

These data have been arranged in the various tables, and represented graphically in the figures. They show several things. (1) The total death rate from CVR disease in Canada has risen from 1901 to 1931. It rose from 184 to 257 for males and from 179 to 256 for females (Table I). (2) Each of the components of the CVR group has experienced a rise in death rate also, except of course the senility group, which has declined (Fig. 1). (3) Diseases of the arteries and veins have shown the greatest increase in death rate, an increase which practically parallels the decrease in deaths due to senility, thus suggesting that a large part of the increase in accuracy of diagnosis has taken place in this group (Fig. 1). (4) Even the inclusion of deaths from senility in the group has not obliterated the rise in death rate from 1901 to 1931. (5) The death rates from CVR disease have fallen in the younger age groups, and have risen in the older age groups (Table I, Fig. 2). (6) Despite the fall in the earlier years of life, the rise in the later years has been more than sufficient to compensate for this, and the net result is a gain.

Reference to Table II shows for example that although in 1931 there were only 82 males between 30 and 39 years who died of CVR disease for every 100 males of the same age dying of the same diseases in 1901, there were 175 males over 80 in 1931 who died of CVR disease for every 100 dying over 80 in 1901. The total male death rate in 1931 was 140 and the female 143, compared with a standard rate of 100 in 1901. Not only have the death rates risen in the higher age groups, but the importance as a cause of death has also risen in these groups (Table III. Fig. 3), so that not only has the number of persons dying of CVR disease risen in proportion to the living population of those ages but of those destined to die in any year a far greater proportion die of CVR disease than was formerly the case. Thus in 1901 CVR deaths formed 11.8 per cent of the total deaths, and in 1931 this number had risen to 25.7 per cent. In the age groups under 30, CVR disease remained practically stationary as a cause of death from 1901 to 1931. It is true that the

TABLE II.

COMPARATIVE RATES OF DEATHS DUE TO CVR DISEASE, USING THE 1901 RATE AS A STANDARD, 100

	10	*10-19*	*20-29*	*30-39*	*40-49*	*50-59*	*60-69*	*70-79*	*Over 80*	*Total*	*Year*
Males:	67	50	79	76	86	108	131	130	159	117	1921
	28	55	59	82	116	138	154	131	175	140	1931
Females:	35	52	44	54	81	109	142	124	164	118	1921
	30	52	63	75	94	127	162	131	180	143	1931

Under 40 in all columns the 1921 and 1931 rates were lower than the 1901. After 50 the 1921 and 1931 rates were uniformly higher than the 1901 rates, and the 1931 rates after 30 were uniformly higher than the 1921 rates, showing that in the higher age groups there is a definite progressive increase in CVR disease.

death rates from CVR disease had materially fallen in these age groups (Tables II and III), but the total death rate had also fallen greatly in these groups, due to the elimination of infectious diseases (Fig. 4). Hence, although far fewer young persons were dying of CVR disease in 1931 than in 1901, far fewer young persons were dying of any cause in the latter year; so that of those destined to die under 30, approximately the same percentage were dying of CVR diseases as had died in 1901.

With respect to the age groups over 30 the reverse is true, and the higher the age group, the more spectacular is the increase in the percentage of total deaths to be ascribed to CVR disease. Thus in 1901, in persons over 70, CVR diseases caused about one-third of all deaths, and in 1931 more than one-half.

accurately just how many of the persons who are dying today are dying because there are more old people than was formerly the case. We can apply the death rate of 1901 for each decade of life to the 1931 population in that age group. That will give us the number of deaths which should have occurred in 1931 were the same proportion dying as in 1901. By adding these figures together we get the total number of deaths for 1931 on the basis of the 1901 death rates for CVR disease.

By using this method we find that had the 1901 rates prevailed in all the age groups in 1931, there would have been 10,466 males and 9,658 females dying of CVR disease in 1931. Those figures would have given us total death rates from CVR disease of 194 for males and 193 for females. The 1901 rates were 184 for

TABLE III.

THE PERCENTAGE OF THE TOTAL DEATH RATE FOR EACH AGE GROUP FORMED BY CVR DISEASE IS SHOWN FOR THE THREE YEARS

Year	*Under 10*	*10-19*	*20-29*	*30-39*	*40-49*	*50-59*	*60-69*	*70-79*	*80 and Over*	*Total*
1901	0.7	5.2	6.2	9.1	14.1	20.0	26.4	32.7	34.8	11.8
1921	0.7	4.9	5.9	9.0	15.9	25.1	36.4	45.1	47.5	22.0
1931	0.6	6.3	7.0	12.2	21.2	31.0	41.0	49.4	53.0	25.7

Pericarditis and acute endocarditis are omitted from these rates, hence the fact that the totals given are a little less than those given in the text, which are based on figures including these two conditions.

Note that from 1901 to 1921 the first real increase in percentage comes in the age group 40-49, but in 1921 to 1931, much earlier.

It was mentioned earlier that a second way of estimating the effect of change in the age of the population was used in order to determine whether there was an actual increase in CVR death rates. I shall go into that a little in detail, for, despite the fact that the tables here show there is an actual increase in death rates and an actual increase in percentage of deaths due to CVR disease, there are people who say, "Of course, there appear to be more deaths, because there are more old people now than there were before. If they do not die in youth of infections they die of CVR disease in old age". That is true, but the point which I wish to make clear is that if that were all then the proportion of old people dying in the two years should be the same. They are not. Therefore some persons are dying of CVR disease today who cannot be accounted for by the above reasoning. As a matter of fact we can compute

males and 179 for females. Therefore an increase of 10 in the male death rate and 14 in the female death rate would not have indicated an actual increase, but would have been due entirely to age change in the population. (Remember that the matter of diagnosis has been compensated for all along in these rates). But if we compare these estimated rates of 194 and 193 with the actual rates obtaining in 1931 of 257 and 256, we see that age change in the population does not account for the increase in the death rates by any means. There were 5,000 males dying of diagnosed and undiagnosed CVR disease in 1901, and 14,145 dying of the same causes in 1931. The difference is 9,145. Of this number, 5,466 (10,466 - 5,000) deaths represent the number due to the fact that we are saving more lives in childhood and so bringing more persons to the age at which they can die of CVR disease. The remainder of the difference,

namely 14,145—10,466, or 3,679, represents the number of deaths due to CVR disease that are a real increase over 1901. The same calculation can be made for the female rates. There were 4,658 females dying of CVR disease in 1901. Had the same proportion died in 1931 there would have been 9,658 deaths. The difference between these two figures, 5,000, represents the number of deaths due to growth of population, and age change in the population. The actual number of feminine deaths from CVR disease was not 9,658 but 12,786. This means then, that in proportion to the population there were actually 3,128 more females dying of CVR disease in 1931 than in 1901. The total number of deaths in Canada from CVR disease which could be looked upon as an actual increase in the disease was for 1931, 6,807.

PROBABLE EXPLANATION OF THE INCREASE

In the face of figures such as those just presented it seems hard to do other than acknowledge that there is an increase in CVR disease in Canada. As to the interpretation of the causes for the increase we are on more debatable ground. Let us turn to Fig. 2, in which the rates for 1931 are compared with the rates for 1901. We note that there has been a marked improvement in the rates for early life but that somewhere between 40 and 50 the improvement ceases and the death rates for the latter year are higher than those for 1901. When we study the trends of the total death rates in Canada for 1901 to 1931 we find that there has been a marked fall, and that this fall is due almost entirely to the fall in the infectious diseases (Fig. 4). This suggests the following. The cause of most CVR disease, apart from congenital defects, in childhood and early adult life is due to damage wrought to the heart and kidneys by the infectious diseases of childhood. The incidence of infectious diseases has been greatly lessened in the thirty year period under survey, the death rate having dropped from approximately 800 in 1901 to 317 in 1931. Therefore the aftermath of CVR diseases following infections has dropped correspondingly. One might argue that with the lessening of infections in childhood there would be more left to die of other diseases, and as a matter of fact that is what does happen in later life when a constitutionally defective CVR system finally gives out. That the CVR death rate does lessen with the decrease in infectious diseases is a fair indication that the latter were in large measure the cause of the former, and that when the cause was eliminated the result disappeared also. With still greater improvement in the field of preventive medicine, we may expect still further reduction in the death rates from CVR disease among young persons, with this reservation in mind, that as an equilibrium is reached between the activities of preventive medicine and the susceptibilities of the population to infections the rate of decline in deaths from infections and the resultant CVR diseases is apt to fall off.

What is the explanation then of the increase in middle life? If CVR disease in young persons was due in large measure to infectious diseases might not the CVR disease of middle age be due to the same cause, and should not its incidence also be lessened when infectious diseases disappear? No doubt many cases of CVR disease have been eliminated in middle life, but their decrease has been more than overshadowed and obscured by the increase resulting from other factors. What are these other factors? We know that not all children develop cardiac or renal lesions following the acute infections of childhood. If the development of these conditions is dependent in large measure upon the presence of an inherently weak heart and kidneys then the course of events becomes clear. We understand the increase of CVR deaths in middle life and the decrease in earlier life, and we know that it is not because we are keeping more people alive that there appears to be an increase, but because we are keeping more people alive with a defective CVR system that there actually is an increase. If there were a selective or differential effect of infectious diseases upon the group with physiologically poor heart and kidneys then elimination of infectious diseases would serve to spare this class in greater proportion than it would the normal persons.

Let us make this quite clear by an example. Suppose that of every 100 persons 20 had an inherently poor heart or kidneys, that is, a heart or kidneys that were not built to last as long as the rest of the body. Suppose that 50 per cent of the population developed infectious diseases, so that 40 normal and 10 CVR cases were affected. The mortality was 20 per cent among the normal, but 80 per cent among the CVR cases, because their heart or kidneys could

not stand the strain of the infection. Hence 8 normal and 8 CVR cases would die, leaving a population of 84 persons, of whom 12 or 14 2/7 per cent were potential CVR cases for later life. Now infectious diseases are eliminated to a large extent in this population and the incidence falls from 50 to 10 per cent. Due to improved methods of treatment, the mortality also falls to 50 per cent in the CVR group and to 12.5 per cent in the normal cases. Thus of the 2 CVR patients one will die, and of the 8 normal patients one will die. This will leave a population of 98 persons, of whom 19, or 19.4 per cent, will be potential CVR cases for middle life. Thus a selective action of infectious diseases upon the two groups of persons, those with normal and those with physiologically defective CVR systems, would produce exactly what we find to be the case, a lowered death rate from CVR disease among the young persons, as infectious diseases are eliminated, and a higher rate from CVR disease among those of middle life, when through the wear and tear of living their CVR systems receive as much damage in a long time as they would have been subjected to in a shorter period under the stress of an acute infection. Nor is this explanation opposed to the idea that the fast pace of modern life plays a large rôle in the increase of CVR deaths, for the more potential CVR cases we save in childhood from acute infections, the more proportionately we have to succumb to conditions which place a strain upon their weakened heart or vessels or kidneys. Therefore it is not because we are keeping more persons alive to middle age that CVR deaths are on the increase, but because we are keeping alive proportionately more of the group with defective CVR systems.

The objection to such studies as this has often been brought forward that the statistics upon which the conclusions are based are so unreliable that the conclusions are worthless. Let us admit that much of the data may be inaccurate, but let us call the attention of these objectors to the following facts which, if admitted, force one to the conclusion that CVR deaths are increasing; which if not admitted run absolutely contrary to the observed state of affairs, that need no data nor statistical analysis for their proof. These facts are as follows. (1) There has been a great decrease in the incidence of and death rate from infectious diseases such as cholera, small-pox, diphtheria, typhoid fever, etc. Surely no one will deny this statement and affirm that these diseases are taking as heavy toll as they did years ago, and that we are failing to diagnose them. (2) Since the total percentage of deaths every year must stand at 100, it is inevitable that as the percentages of deaths caused by some diseases drop the percentages caused by others must rise, or a new category of diseases must be found which compensates for the diminution of the first group. (3) No such new and extensive category of diseases has been found to replace the infectious disease group; therefore the percentages of deaths caused by other diseases, largely constitutional in nature, must rise. (4) If CVR deaths are not increasing, then such diseases as cancer and diabetes must be increasing more rapidly than we had thought. We cannot logically tell the public that we have eliminated many of the infectious diseases and then say that none of the other diseases are increasing. If every cause of death except one be eliminated then that one becomes the sole cause of death, and it matters not how long delayed the day of death becomes, or how much the death rate from the disease may fall due to that delay or to the tremendous increase of births which might occur, that cause of death becomes of paramount importance. Therefore the plea that inaccurate statistics do not permit us to judge with certainty as to an increase in CVR disease must be discarded, for we know that we are lessening deaths from infections, therefore we must be increasing them from other causes. CVR deaths share in this increase.

Summing up the evidence then from the data for Canada from 1901 to 1931, we may say that there has been a definite increase in CVR death rates for both sexes, and that analysis of the death rates by age groups shows that the age change in the population is responsible for but a minor part of the increase. This caused but 5.4 per cent increase out of a total increase of 40 per cent in the male death rates from CVR disease from 1901 to 1931. Nor is better diagnosis a major factor, for, if it were, we should have expected the rates to increase rather uniformly in all age groups, and we have compensated for the increased accuracy of diagnosis in the older age groups by including among the

CVR deaths one-half of those listed as due to senility. The explanation of the increased number of deaths over and above those expected because of growing population and age change in the population is to be found in all probability in the fact that through the selective action of infectious diseases upon those with physiologically poor heart and kidneys, and the diminution in incidence of infectious diseases, preventive medicine has served to prolong the lives of those with inherently defective cardiovascular-renal systems in greater proportion than it has those who were normal in this respect, with a resultant concentration of this CVR group in the later years of life. It is not to be understood from this that every case of CVR disease in middle life is to be interpreted as dependent upon inherent defects in the system; it is merely stated that the excess or increased number of deaths beyond what was formerly the case may have their origin in constitutional defects in the cardiovascular system.

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Case Reports

BONE DEFECT OF THE ULNA TREATED BY BONE GRAFT*

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The following case of a large bone defect of the ulna due to osteomyelitis, with sequestration and inadequate involucrum formation, was successfully treated by a tibial bone transplant. Certain features of such grafts used in areas of latent pyogenic infection are illustrated.

M.F., a white female, of 14 years, was admitted to the University of Chicago Clinics on July 30, 1933, complaining of a painful red swelling of the distal half of the right forearm of about a week's duration. The forearm had been struck against a door nine days before, and there had been a boil, now healed completely, on the opposite forearm about two weeks previously. There were high fever and leucocytosis, and pus was aspirated from a fluctuant area over the right ulna, which on culture showed a pure growth of *Staph. aureus*. When an incision 15 cm. in length was made over the ulna, the periosteum was found to be lifted up by a purulent exudate throughout the length of the bone. Two holes were drilled in the ulna, and the wound packed loosely with dry gauze. The fever then subsided rapidly. On discharge, 15 days after operation, an x-ray showed periosteal new bone formation at intervals along the length of the ulna.

The wound continued to drain, although there was healing by granulation in part, and x-rays, taken on September 27th (Fig. 1), showed sequestration of about 12 cm. of the shaft. Splints and casts were used until this sequestrum presented itself in the wound, and was removed, on October 24, 1933; after its removal the wound healed within three weeks. It was expected that the involucrum observed to be forming as early as August 17th would continue to increase; this, however, was not the case. A bone defect of about 7 cm. was seen in the skiagrams of January 2, 1934, and subsequent films showed progressive atrophy of the fragmentary involucrum and of the bone ends (Fig. 2, taken May 15, 1934).

Because of the progressive atrophy it was thought that the bone defect would remain permanently. On May 18, 1934, a tibial bone graft nearly 13 cm. long was inserted into the defect, fastened in place by chromic catgut, with three smaller bone fragments overlapping the junctions of the graft and the ulna ends, and maintained in position by a cast. The graft was placed so that its periosteal surface faced the radius. No evidence of infection was encountered during the operation, but there was a febrile reaction afterwards, and a considerable purulent exudate from the wound, which gradually lessened, but persisted until the dead portion of the graft was removed on September 5, 1934, about 3½ months after its insertion. The wound then promptly healed. Skiagrams taken through the cast during this period showed progressive absorption of the graft, but also considerable new bone formation along its periosteal surface (Fig. 3). When the cast was removed

* From the Department of Surgery, the University of Chicago.

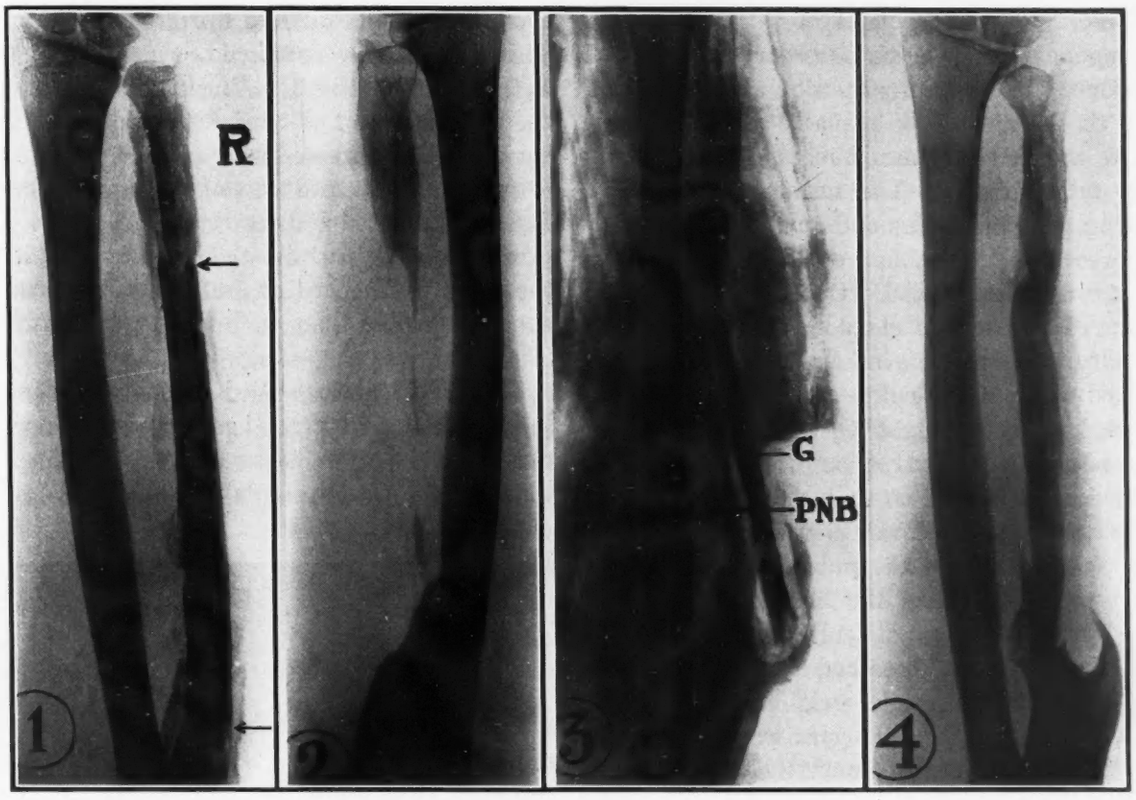

Fig. 1.—Skiagram of forearm, September 27, 1933, showing sequestration of a large segment of the ulna (between arrows), and periosteal new bone forming an involucrum. **Fig. 2.**—Skiagram taken May 15, 1934, showing bone defect of ulna. Note the conical atrophy of the ulna ends. **Fig. 3.**—Skiagram taken August 21, 1934, showing the tibial transplant (G) and the layer of periosteal new bone (PNB), with a zone of absorption between. **Fig. 4.**—Skiagram showing condition of the ulna on May 16, 1935. At this time there was almost normal function, and no deformity except for the spur shown in the film.

this new bone was found to bridge the defect in the ulna, and progressively increased in thickness until at the most recent examination, on May 16, 1935, it was of nearly normal width and density (Fig. 4). At this time there was almost normal function of the forearm, and no deformity of forearm or hand, except for the small spur near the upper end of the ulna, which can be expected to be absorbed more or less completely.

The interesting feature of the case described is the fact that although the tibial bone graft used to fill the defect of the ulna caused a flare-up of the latent pyogenic infection which eventually necessitated removal of the graft there was sufficient new bone formation on its periosteal surface to bridge the gap, and to result in regeneration of the ulna. This formation of periosteal new bone on bone fragments which later sequestrate was not infrequently observed during the Great War (Phemister, D. B., personal communication). The part played in the present case by the original periosteum is a questionable one, *i.e.*, it might be that the supplying of a local source of bone salts stimulated it to form bone. This seems unlikely, however, in view of the long period during which it failed to do so, and the relative rapidity with which the ulna regenerated after the transplant. Apparently, then, the original periosteum was too much injured by the infection to regenerate a shaft for the ulna, and although the major part of the tibial graft was similarly killed, its periosteum became vascularized, and survived, finally producing sufficient bone to fill in the ulnar defect.

FRACTURE OF THE FEMUR OCCURRING AT DELIVERY

By T. E. Brown, M.D.,

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The mother, aged 31, had given birth to three children unattended by a physician. This time, after having been in labour for nine hours, during the last three of which the pains had been prolonged and frequent, outside assistance was requested.

Upon arrival the pains were found to be strong and regular, occurring every two minutes. Abdominally, an unusual position was apparent, and the head could be palpated at the left side above the pelvic brim. Bimanually, the cervix was fully dilated. The membranes ruptured during the examination and an arm prolapsed.

As soon as preparations could be made the patient was anæsthetized. One leg was secured after displacing the shoulder, but it was not possible to grasp the other. The infant was turned without difficulty and extraction commenced, using the right leg with pressure upon the abdomen. The extraction progressed steadily with each pain and no undue traction was applied to the leg. However, when the buttocks were passing under the pubic arch, a distinct snap was heard, like the breaking of a lead pencil. There was no difficulty in delivering the head and the infant breathed shortly thereafter. The infant was a female, weighing 6¼ pounds. On examination, the left femur was found to be fractured, apparently transversely, about the junction of the upper and middle thirds.

These cases should be hospitalized if at all possible, but where conditions are such that it is deemed advisable to treat them at home, the method described herein may prove useful. In this case the nearest hospital was seventy miles away, over bad dirt roads. The decision was made to treat the child at home, where the mother could nurse her. Some fairly stout cord and a small pulley were obtained, and with a hammer and saw a small portable bed was constructed from an apple-box. Two uprights with a cross-piece at the top were nailed to the sides as shown in the diagram (Fig. 1). The idea was to arrange the apparatus so that the baby could be taken to the mother and nursed with as little disturbance as possible. Adhesive traction was applied to the legs as illustrated and enough weight to the cord over the pulley to raise the buttocks almost off the pillow. The bed or frame was constructed slightly smaller than an ordinary sized pillow. The pillow was protected by a rubber sheet.

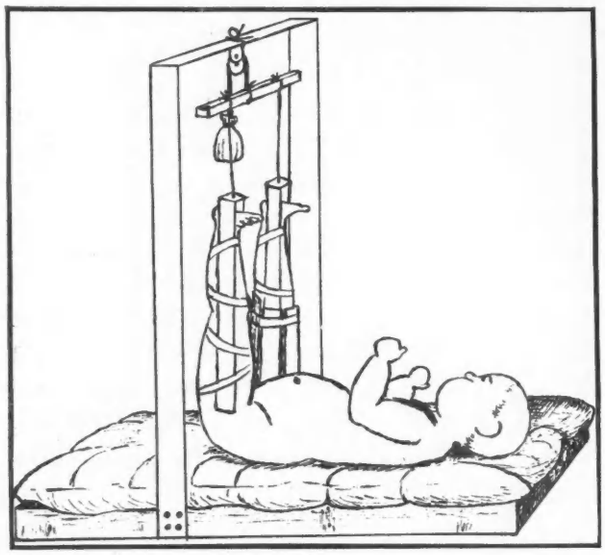

Fig. 1

The child had been oiled and wrapped in absorbent cotton. Instructions were given how to drape the uprights in order to keep the legs warm, and a food formula was left, to be given until lactation started.

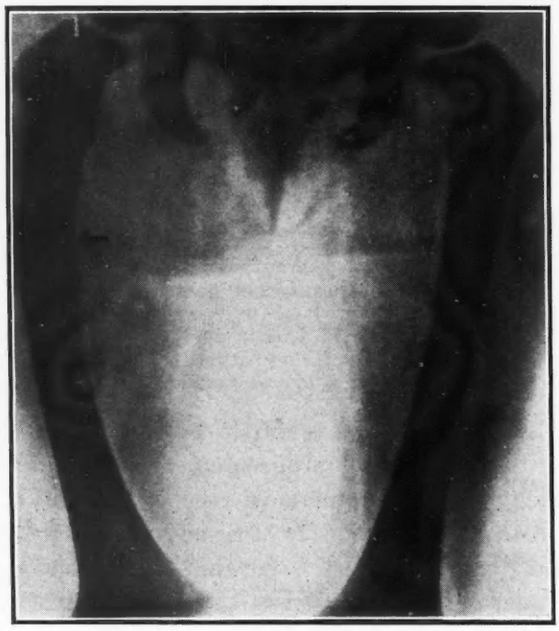

Fig. 2

When seen five days later it was noticed that movement of the leg caused flexion at the site of the fracture. To reduce this to a minimum padded splints made from tongue depressors were applied, extending from the knee to the groin. A splint was placed anteriorly, laterally and posteriorly; the posterior extending well down on the buttock. These were held in place by adhesive plaster. In three weeks there was firm union with a great deal of callus formation. When the extension was removed at this time there was about one-half inch of shortening. The skin was in good condition.

Until the mother was about, the child was looked after by an untrained young woman. The infant had to be fed artificially as the mother

did not have milk for her. At first an attempt was made to encourage the functioning of the breasts by putting the child to them. The mother could put the child to the breast without difficulty to her or disturbance of the child.

The child learned to walk at 16 months. The x-ray film shows the femur at 19 months (Fig. 2). Upon examination at this time there was practically no difference in the appearance of the two legs. Measurements showed about one-half an inch of shortening. The child walks normally without limping or tilting of the pelvis.

The reason for reporting this case is because fracture of the femur during delivery is of comparatively infrequent occurrence in general practice. The service of an orthopædic specialist is not always available, and the question is how best to treat the case. There are various ways of dealing with the condition by fixation without extension, usually in an unsatisfactory anatomical position. The consensus seems to be that the best method of treatment is by means of over-head extension applied to one or both legs. Frederick Christopher[1] describes a method of applying this, as does Russell Howard.[2] Wilson and Cochrane[3] also favour over-head extension, using the weight of the buttocks for counter-traction. Ake Rydén[4] reports that in the Obstetrical Clinic of Lund, from 1900 to 1934, there were approximately 40,000 deliveries, and among that number there were 16 fractured femurs. He recommends a type of extension first advanced by Schanz in 1928. A modification of this is useful for fracture of the arm also.

An endeavour has been made to describe a simple means of treating fracture of the femur in the newly born, which in this case was satisfactory. The infant was fairly comfortable and could be easily looked after by the nurse; at the same time she could be conveniently carried to the bed and nursed by the mother during the post-partum period.

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Clinical and Laboratory Notes

S.U.P.36: A VALUABLE AID IN THE TREATMENT OF MANY ACUTE INFECTIONS

BY JOSEPH H. GROVE,

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The treatment of acute non-specific infections as carried out by many physicians does not show much advance over that of twenty-five years ago. This may seem a strong statement, but I think that anyone will find corroboration of it if he consults the older text books. Heat or cold, rest in bed, diet, the knife, and pharmacopœial drugs nearly exhaust the repertoire.

A large proportion of the cases one meets in general practice are acute infections, often of a minor nature. The physician sees far fewer of such than he should, partly from economic reasons, and, partly, because the patient with the help of the drug store, pseudo-scientific articles in the daily press, and the radio, treats himself or his family, because he feels the physician has little to offer that is any better.

I think the physician in general practice would attract more patients and increase the appreciation of the public if he could offer something in advance of the usual mill run of treatment. It would also be a source of satisfaction to the conscientious medical attendant if he could give something better than conventional treatment. He can offer more than this if he cares to investigate certain lines of treatment often overlooked or neglected.

Non-specific protein therapy is one thing of value in acute infections. It has the disadvantage of causing a severe reaction, as in the injection of boiled milk or typhoid vaccine. The more expensive agents like the German "Aolan" and the British "Edwenil" are often very effective, but they are expensive.

Another line of treatment and one with which this article is chiefly concerned is the use of the drug S.U.P.36 (British Drug Houses). This is cheap, and, while not a cure-all, is usually very effective where indicated. It is a big advance in the treatment of many acute infections which have no specific therapy. S.U.P.36 is described as the symmetrical urea of P-benzol-P-amino-benzolamino-napthol-3: sodium sulphonate.

In non-specific infections the injection of S.U.P.36 causes a favourable general response (with a few exceptions noted below). The drug apparently stimulates the body to increase its own defences and throw off the infection more quickly. It is especially valuable in the treatment of influenza and the prevention of its complications, in acute otitis media (with an

occasional exception), in pus infections, where it causes the condition either to recede or come more quickly to a head so the knife may be used to evacuate the pus. In nasopharyngeal infections of infants the condition is usually cleared up after two or three injections. One injection will often abort a head cold in an adult. In pneumonia, especially in the aged, the drug is of great value. It is of no value in *B. coli* infections, as in cystitis, Bartholinian abscess, endocervicitis or rectal fistula. It is of no value in phlebitis.

S.U.P.36 is injected intra-muscularly, and causes some local pain, redness and soreness around the point of injection. This local reaction persists from 12 to 24 hours, but any disadvantages are far outweighed by the favourable general response. The best results are obtained by injections of 0.5 c.c. once or twice a day, for from 3 to 6 days.

The beneficial effects are: (1) a quick drop in temperature; (2) easing of myalgic pain and headache, (as in influenza) in an hour or so; (3) general improvement of the patient's condition and resistance; (4) shortening of the period of morbidity by about one-half in cases where the drug is effective; (5) prevention of complications following influenza, otitis media, head colds and bronchitis.

A word of caution is necessary regarding the sterilization of the syringe and needle to be used. They should always be boiled and not sterilized with alcohol, ether and distilled water, as is the common practice of trained nurses. If the latter method is used cellulitis at the site of injection sometimes follows. This point was brought to my attention by Dr. T. M. Savage, of Guelph, Ont., who uses the drug extensively and is responsible for my interest in it. He has used the drug for over four years and has had some remarkably successful results in cases of serious infection. He reports, however, two cases of anaphylaxis with œdema of the glottis and one fatal case of gas gangrene which started at the site of injection, although this was not proved to be due to the S.U.P.36. I have had no bad results, probably because I always boil my syringe and needles. The most spectacular case I have had was a bronchial pneumonia following influenza. The patient was a male, aged 51, very stout, suffering from diabetes mellitus, I saw him first on the 8th day after the onset of the influenza which was the 2nd day after the onset of the pneumonia, judging from the history of pleural pain, increased cough, rusty sputum and the general prostration of the patient. The temperature was 103.5°; respirations, 40; pulse, 120. The face was cyanosed, and there were frequent cough, rusty sputum, pleural pain, and depression. The chest on auscultation showed all types of râles and some patches of consolidation, with bronchial breathing on the left side. In five days the temperature was normal and remained so. The sputum was white in two days, the pain gone, and the patient was taking nourishment well. The temperature dropped after every injection of S.U.P.36 and the pulse rate and respirations improved. This patient was given S.U.P.36 every 12 hours in the dosage of 0.5 c.c.; lots of fluids by mouth, digitalis, codeine for the cough, and linseed poultices, continually kept hot. He made an uninterrupted recovery.

A point to be considered in the use of this drug is the favourable psychological effect, at least in adults, of the exhibition of a drug by means of hypodermic injection. It is something a patient does not get in a drug store, and when the usual favourable result ensues it tends to re-establish in his mind some of the respect for the powers of the physician.

The conclusions arrived at as to the value of S.U.P.36 are the result of daily observations on my part for over three years in a large number of cases, and have been confirmed by the more extensive experience of Dr. T. M. Savage, of Guelph, and his colleagues. The drug has been on the market for some years, but its value is apparently not generally known especially in some of the teaching centres. Favourable comment on its use has appeared in the *British Medical Journal*. Many drugs in the past which have been widely advertised and for which extravagant claims have been made have been relegated into the limbo of forgotten things. I do not think that S.U.P.36 will be destined to this fate, because it actually does what is claimed for it, with certain limitations as noted above, and its value should be more widely recognized.

Congenital Syphilis: Diagnosis by Means of Dark-field Examination of Scrapings from the Umbilical Vein.—In his series of cases N. R. Ingraham, Jr., states that dark-field examination of the umbilical vein has been instrumental in detecting syphilis in nineteen (21.8 per cent) of the 87 living offspring of syphilitic mothers on whom it was tried, with an accuracy which might be considered 100 per cent, and at a time in the infant's life when most other clinical criteria and laboratory aids are unsuccessful. Since 35 of the living infants studied, however, were actually proved by observation to have syphilis, it is needless to say that a negative dark-field examination does not rule out syphilis in the child, but merely indicates the necessity of studying the infant by other methods. The fact that in 54 per cent of the diseased children the diagnosis was made within a few hours after birth seems to indicate that this method has a diagnostic value which somewhat overshadows its cumbersomeness. It is truly unpractical to examine a specimen of the cord obtained at every delivery in a large maternity service, but, when the diagnosis of syphilis is made in the mother, as it should be, before delivery takes place, then the suspected syphilitic specimens can be examined without placing too great a burden on the physicians in charge, and the diagnosis of congenital syphilis can be established immediately in a limited number of cases.—*J. Am. M. Ass.*, 1935, **105:** 560.

Editorial

RECENT EXPERIMENTAL WORK ON CORONARY OCCLUSION

CORONARY occlusion, practically the same thing as coronary thrombosis, is, beyond doubt, increasing in frequency. As as rule its clinical manifestations are so clean-cut and so widely recognized that a correct diagnosis is easily arrived at. This, however, cannot be the full explanation. The real reason for the increase in its incidence lies, we think, in the fact that our increased control over infections disease has preserved more people to the later years of life when degenerative processes begin to manifest their ascendancy. Cardio- vascular-renal is now easily at the top of the list as a cause of death. In this category comes coronary occlusion. The dramatic suddenness of the attack in coronary thrombosis and its catastrophic effects alone would suffice to rivet attention upon the condition, and it is small wonder that it should be ever in the mind of the internist. During the past two or three years it has also aroused the interest of the pathologist and the laboratory worker, and quite recently some striking experimental results have been recorded.

In the present issue of the *Journal* can be found an important article by Drs. G. E. Hall and G. H. Ettinger, and Sir Frederick Banting, the first of its kind, we understand, in which an account is given of a successful attempt to induce coronary thrombosis and myocardial failure in dogs by the intravenous injection of acetylcholine. These investigators were able to produce a series of lesions comparable to those found in man when the coronary circulation has been gravely impeded, namely, hyalinization of the medium and smaller arteries with fibrosis, infarction of the myocardium, fatty degeneration of the heart muscle about the infarcted areas, fibrosis, and canalization of occluding thrombi. These lesions were well marked in the older animals, less marked in the younger. In addition, arterial damage and thrombosis were seen in the liver, intestine and mesentery, and, with infarction, in the spleen and kidney (this in one animal only). The reason for all this is not quite clear and the matter requires further study. As to the facts, the microphotographs illustrating the article carry conviction. The existence of hyaline degeneration in the vessel walls and in the cardiac muscle suggests a toxic action of the acetylcholine, which agent, indeed, was exhibited in relatively large amounts. Against this is the fact that acetylcholine is an unstable substance and after injection speedily disappears from the circulation. The authors point to the fact, as important for the explanation of their results, that the larger coronary vessels are provided with an abundant nerve supply, both from the vagus and the sympathetic system. It has been shown that stimulation of the vagus produces constriction of the coronary arteries, due, according to current ideas, to the action of liberated acetylcholine. *A priori*, one would expect that any permanent lesions produced by prolonged stimulation of the vagus would be evident in those areas most abundantly supplied by vagus fibres, and this is exactly what Banting and his co-workers found. One would infer that persistent contraction of the coronary arteries in the human subject is competent to produce degenerative changes in the vessel walls which in time can result in thrombosis. An extraneous toxic element need not be excluded. This idea is not new, but it is interesting to have some experimental evidence to support it.

Other recent experimental work is concerned not with the etiology of coronary occlusion but with the practical problem of mitigating its effects.

The question of coronary occlusion is closely bound up with that of collateral circulation. Considering that the function of the heart is of such prime importance in maintaining life it is somewhat singular that that organ is so badly protected against disturbances of its own circulation. The only direct continuity it has with adjacent structures is by means of the walls of the great vessels, the fat, the lymphatics, and the nerves at the base. It is therefore difficult for the heart to adapt itself to the emergency when the blood supply to its muscle is suddenly cut off. However, if sufficient time be given even the complete

closure of the coronary arteries is not incompatible with life. A collateral circulation is established.

We used to be taught that the coronaries are "end-arteries", and, therefore, that blockage in them meant complete stoppage of the circulation and death of the tissues in the region involved. This conception has been proved to be incorrect. Some years ago Dr. Gross, then of Montreal, showed by means of injection experiments that the coronaries possessed rather free anastomoses. This is all to the good so far as it goes, but is not good enough.

Normally, the heart can receive a supply of blood from three sources—the coronary vessels, the vessels of Vieussens and of Thebesius, and through extra-cardiac anastomoses that exist between the coronary system and the blood vessels (rami telæ adiposæ and aortic vasa vasorum) in the tissues at the base of the heart. Such communications have been demonstrated. Theoretically at least, there might be a venous back-flow from the cavity of the right auricle via the coronary sinus. A mechanism for the production of a collateral circulation in case of coronary occlusion undoubtedly exists, even if we must admit that it is not so effective as we could wish. When coronary occlusion occurs the eventual outcome is mainly dependent on the location and extent of the occlusion and on the possibility that a sufficient collateral circulation can be established. This is in accord with clinical experience. If the coronary seizure is not immediately fatal the patient may survive for a more or less prolonged period, perhaps to die in a second or third attack, from heart failure, or from some intercurrent affection, weeks, months or years after.

Under pathological conditions another mechanism may come into operation. Thorel[1] reported the case of a patient who had had complete obliteration of both major coronary arteries, with pericardial adhesions. He suggested that these adhesions provided a blood supply for the heart. The first experiments conducted with this thought in mind are said to have been performed by C. S. Beck in 1932.

H. F. Robertson,[2] in an attempt to elucidate the subject, produced gradual occlusion of the coronary arteries in dogs by means of ligature. As a result of the traumatism incident to his method adhesions were produced between the layers of the pericardium. He concluded from his observations that the nutrition of the myocardium depended definitely on the blood-vessels contained in the pericardial adhesions. He thought, also, that the vessels of Vieussens and of Thebesius played little or no part in the maintenance of an adequate circulation, and that there was little or no evidence to show that an anastomosis developed between the epicardial and intercoronary vessels by way of the aortic vasa vasorum.

In experimental work on dogs, Beck and Tichy[3] utilized the pericardium, pericardial fat and mediastinal tissues to provide the heart with a vascular bed for the supply of blood when the coronary circulation was interfered with. Continuity of tissue was achieved by the production of pericardial adhesions, which was effected by means of abrasion in various ways. The coronary vessels were in certain instances occluded by ligature. The experiments showed that vascularization of the myocardium was slight and in some cases almost completely lacking if the coronary circulation was normal. Put otherwise, "*The bloodvessels grow into the myocardium when the latter has need of more blood.*" At the outset of their study the authors had hoped to destroy or obstruct the entire coronary circulation and have a new collateral circulation established. They almost succeeded. In one experiment where about 85 per cent of the total cross-sectional area of both coronary arteries was occluded the animal survived and was normally active.

Following up this work from a pathologico-anatomical point of view, Moritz and Beck[4] examined 94 human hearts in which a major coronary artery had been occluded, with the hope of determining the desirability of

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2. ROBERTSON, H. F.: The reestablishment of cardiac circulation during progressive coronary occlusion, *Am. Heart J.*, 1935, **10**: 533.

3. BECK, C. S. AND TICHY, V. L.: The production of a collateral circulation in the heart, *Am. Heart J.*, 1935, **10**: 849.

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operative measures in the human subject along the lines above indicated. The details of their investigation are most interesting and to the point, but, unfortunately, cannot be fully entered into here. Out of 94 patients only 14 died as a direct result of the first major coronary occlusion. In the case of the 80 who survived the first occlusion the question was considered whether or not they could have been protected against the disastrous results of subsequent occlusions by the production of an extracardiac collateral circulation. In 37 of the 80 concomitant disease or continuous cardiac incompetence would have rendered the operation unjustifiable. The remaining 43 would have benefited, with the exception of 7 who died of other causes. Their conclusion from these data is that there was a period after the first coronary occlusion in the lives of 43 persons out of 94 when the production of an extracardiac coronary collateral circulation might have been feasible and beneficial. Beck has done the operation on the human being, but we are not informed as to the result (*loc. cit.*[3]).

All this gives us hope. The operation in question may be difficult and risky, though not so much so as some that have recently been devised, notably those on the brain, the adrenal, and the sympathetic nervous system. Doubtless, the indications for it are strictly limited. Obviously, a state of cardiac decompensation would contraindicate it and its sphere of application would have to be thoroughly worked out. But coronary thrombosis is so devastating an affection that almost any risk would seem justifiable.

A.G.N.

DINITROPHENOL AND CATARACT

NEARLY two years ago[1] we published an article on dinitrophenol by Drs. Rabinowitch and Fowler, of Montreal. These workers made a careful clinical study of this drug, which was then coming into vogue, and they concluded their presentation with these words:—"The ease with which dinitrophenol increases metabolism, its known toxicity with excess doses, and the difficulties with dosage (irregular response to the same dose in the same individual) emphasize the necessity for further study. In the opinion of the writers the use of the drug in clinical work should as yet be confined to hospital practice." This conservative attitude has been abundantly justified by subsequent events. Dinitrophenol has come to be rather freely used, both under physicians' orders and otherwise. It is especially popular for the purpose of reducing weight and, in the United States, it enters into the composition of some half dozen or more patent remedies advocated for "slimming". One of these called "Slim" has been prohibited under the Food and Drugs Act. We are somewhat better off in Canada, for obesity is one of a number of common conditions for which it is unlawful to advertise a "cure". As a result of the unscientific use of dinitrophenol certain unpleasant reactions have been met with, some of them serious, and there have been even fatalities. Drs. Tainter, Stockton and Cutting, of Leland Stanford University, in a paper read at the Combined Annual Meeting of the American and Canadian Medical Associations at Atlantic City last June, reported the occurrence of rashes on the skin, and neuritis of the arms, legs and tongue, though these unpleasant effects were only observed in persons who had taken unusually large doses of the drug. Granulocytopenia has also been met with after the use of dinitrophenol.

Another sequel to be reported lately is cataract, of which serious condition a number of instances have been recorded in the American literature since the beginning of July last.[2] Boardman cites six cases, all in

1. RABINOWITCH, I. M. AND FOWLER, A. F.: Dinitrophenol, *Canad. M. Ass. J.*, 1934, **30:** 128.

2. BOARDMAN, W. W.: Rapidly developing cataract after dinitrophenol, *J. Am. M. Ass.*, 1935, **105:** 108.
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COGAN, D. G. AND COGAN, F. C.: Dinitrophenol cataract, *ibid.*, 1935, **105:** 793.
LAZAR, N. K.: Cataract following the use of dinitrophenol, *ibid.*, 1935, **105:** 794.
KNISKERN, P. W.: Cataract following dinitrophenol, *ibid.*, 1935, **105:** 794.
ALLEN, T. D. AND BENSON, V. M.: Late development of cataract following the use of dinitrophenol about a year before, *ibid.*, 1935, **105:** 795.

women, occurring between the ages of thirty and fifty, a time of life when spontaneous cataract is but rarely met with. The cataracts observed were bilateral and rapidly progressive, becoming noticeably worse in a few days, and in one case almost complete blindness developed within a month. Two of the patients had received dinitrophenol under strict medical supervision, a third had treated herself, and in regard to the others no particulars are given. Other cases were reported about the same time. It is worth noting in this connection that cataract may develop some time after the drug has been discontinued.

In associating dinitrophenol with the etiology of cataract there are several possibilities that come into mind. The drug itself may be toxic. Or, as it has not been standardized, a contaminant may be at fault. Doctor Tainter and his associates found some samples to be impure. Or, the dehydration of tissues which dinitrophenol is known to produce may be a factor. Or, again, the drug or some substance associated with it may cause an upset of metabolism. Finally, inasmuch as for the purpose of "slimming" severe dietary restrictions are often prescribed along with the drug treatment, malnutrition and unbalanced diet may play a part. And this brings us to the consideration of the rôle of vitamins in the etiology of cataract.

The fact that a deficiency of vitamin A can bring about xerosis ophthalmica has already been well established, but the part played by other vitamins in relation to pathological conditions of the eye is only now being investigated. At the moment vitamin C is to the fore. Notable in this connection are the names of Adams,[3] v. Euler and Martius,[4] Müller and Buschke,[5] Nakamura and Nakamura,[6] and Josephson.[7] Adams observed that in over-ripe and in old traumatic cataracts in man both glutathionine and the thermostable reduction system were absent from the lens. Müller showed that there is less vitamin C in the mature cataract than in the normal lens, and also that in cataract due to naphthalin this vitamin disappears from the aqueous humour. Müller found also that by the daily injection of ascorbic acid (vitamin C) the opacities in the lens could be made to disappear. Josephson, basing himself on such-like observations, has used ascorbic acid in all forms of cataract. While his results with senile cataract were gratifying, in the case of dinitrophenol cataract the improvement was strikingly rapid. The other manifestations of dinitrophenol poisoning, such as the neuritis, also responded promptly. It is probably too soon to assert that we have a positive cure for cataract through medical measures, but the available evidence is for the present encouraging.

In the meantime Dr. Boardman is of the opinion that under existing circumstances the use of dinitrophenol is definitely contraindicated, and the Council on Pharmacy and Chemistry of the American Medical Association last July refused to include the drug in "New and Non-official Remedies". In England, too, the use of dinitrophenol is frowned upon. In 1934 *The Lancet*[8], in speaking of obesity, asked the question editorially "Is it justifiable in dealing with a condition which almost always responds readily to a little wholesome discipline (*i.e.*, dietetic restriction), to employ instead a drug of unquestioned potency but uncertain toxicity?" Clearly, not.

A.G.N.

3. ADAMS, D. R.: Study of correlation between biochemical and intraocular changes induced in rabbits by administration of naphthalene, *Brit. J. Ophth.*, 1930, **14:** 545.
4. v. EULER, H. AND MARTIUS, C.: Ueber den Gehalt der Augenlinsen an Sulfhydrylverbindungen und an Ascorbinsäure., *Zeitschr. f. physiol. Chem.*, 1933, **222:** 65.
5. MÜLLER, H. K. AND BUSCHKE, W.: Linsenatmung und Vitamin C des Kammerwassers, *Arch. f. Augenheilk.*, 1934, **108:** 592.
6. NAKAMURA, B. AND NAKAMURA, O.: Ueber das Vitamin C in der Linse und dem Kammerwasser der menschlichen Katarakte, *Arch. f. Ophth.*, 1935, **134:** 197.
7. JOSEPHSON, E. M.: Ascorbic acid in cataract with special reference to dinitrophenol cataracts, *Science*, 1935, **82:** 222.
8. Editorial comment, *The Lancet*, 1934, **1:** 746.

Editorial Comments

Dr. Allan Roy Dafoe

None will forget the interest that was aroused by the announcement that on March 29, 1934, quintuplets had been born in Callander, an obscure hamlet in Ontario. Callander is now on the map. The medical man officiating on that occasion was Dr. Allan Roy Dafoe, who, much to his surprise and, doubtless, somewhat to his consternation, found himself over night a world-famous character. At the time this *Journal* had no official information in regard to this extraordinary event, nor, indeed, did its action seem called for. The daily press did not fail to take advantage of the God-sent opportunity, and said all and more than all that was then necessary on the subject. It rang all the possible changes. But now that the excitement has cooled off and the "ballyhoo" has passed on we welcome Doctor Dafoe to our columns, and our readers will find in this issue an authoritative report from him describing the successful fight he made for the lives of his tiny charges. Unlike what has appeared before, this is a scientific record, and is worthy of preservation.

Doctor Dafoe tells us in a straightforward and unadorned manner of what took place on that eventful morning. We learn of his handicaps and the simple, yet effective, measures he took to overcome them. We note the manner of his education! We hail him as the only physician in history who has succeeded in nurturing quintuplets to a point where they may be reasonably expected to maintain their existence for a prolonged period. In his modest way Doctor Dafoe disclaims any special merit, but, when we realize the special difficulties which beset him, apart from the purely medical problem, the unwelcome attentions of the publicity "stunters" and the commercial "exploiters", the undesired intrusion of all and sundry, we are ready to award him all the praise. Only a man of sound medical learning, of experience, of sturdy commonsense, and imperturbable good nature could have carried on and won out. Doctor Dafoe has received the imprimatur of his King, and our Association has done what it could to honour him by making him an Honorary Member. We can assure him that his colleagues everywhere appreciate his work. A.G.N.

Medical Periodical Literature

The manner of presentation of medical thought is a subject that interests the editors of medical periodicals at all times. It ought equally to interest those who prepare articles for periodicals. Writing for publication is not easy, nor, in most cases, does it come naturally. Even if it is a gift, that gift can be cultivated. The position of an editor, like that of Gilbert and Sullivan's policeman, "is not a happy one", at least not always! He feels impelled to make certain changes in a manuscript, the reasons for which are not understood by the writers, and so may give offence. While it is true that editors exist for the purpose of editing, their task could be rendered easier by attention to certain points on the part of the contributor. Much might be said on this subject, but we wish at the moment to direct attention to certain phases of it only.

The first desideratum in a medical paper is that the author should have something to say that is worth while. His paper should embody some advance in knowledge, some *new* discovery, some clinical experience, some unusual case. A paper of the "arm-chair" variety, while it may have value under certain circumstances, rarely deserves to be embalmed in the pages of a medical journal. Then, the statements in the paper should be accurate, and clearly and concisely expressed. Style also counts, but not so much. It has been said, with justification, that most medical articles could be reworded and rearranged so as to save 20 per cent of space. If this be so, applying the principle to our own *Journal*, the saving would be more than two thousand dollars on the printing bill in a year. But the editors have realized this and have acted accordingly.

The Schorstein Memorial Lecture, delivered recently at the London Hospital by Professor William Bulloch, F.R.S., affords food for thought and is commended to the attention of our readers and prospective contributors.* The subject was "Medical Periodical Literature". Professor Bulloch comments on the vast output on various medical topics. He states that in 1881 Dr. J. S. Billings, of the Surgeon-General's office, Washington, estimated that there were 180,000 doctors in the world, of whom 1,600 contributed to medical literature. Today there were probably more than 400,000 doctors and the number of the contributors had grown in proportion. The *World List of Scientific Periodicals*, published in 1934 by the Oxford University Press, and covering the period 1900 to 1931, contained the names of more than 23,000 such periodicals, and Professor Bulloch estimated that of these 5,000 were medical. Taking the subject of tuberculosis, as the "horrible example", between the years 1893 and 1932, 34,000 articles had been published. In other words, during the past forty years at least

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* Bulloch, W.: Medical Periodical Literature, *Brit. M. J.*, 1935, **2**: 810.

two articles on tuberculosis have been published every day! All this matter had to be catalogued, indexed and stored, and Professor Bulloch asked, pertinently, where this activity was going to end. It is certain that much of this output was not worth preserving. Someone has said that, presently, the population not actually engaged in writing would be employed in indexing and cataloguing. Contributing to this state of congestion is the practice of printing the same article in more than one journal at the same time. Professor Bulloch said that on one occasion when he was in a library he had on the table before him six different journals all containing the same article!

Professor Bulloch urged his hearers to verify their references to literature from the original sources. Where the original is unobtainable the person from whom the quotation was obtained should be mentioned. We heartily endorse this. It is most important. Our staff is too small for us to look up all the references in the case of a given paper, but when we do so we frequently find mistakes. A reference that is incorrect is worse than useless, it is misleading. A reference should contain the author's name, with his initials, the title of his work, the journal in which it has appeared, the year, volume number, and page. Authors should attend to this. Too often the MS. has been turned over to the typewriter and is not subsequently checked. An MS. when it is offered to a journal should be in all respects ready for printing. Professor Bulloch remarked, in this connection, that medical literature contains many examples of slip-shod work. He instanced a book on peritonitis in which the numbers given in the index corresponded not at all to the pages in the text. Actually, the page numbers of the author's MS. had been taken instead of those of the printed sheets.

Titles should not be too lengthy. In the Middle Ages, and even later, titles frequently amounted to an epitome of the book. In the cases of medical monographs one wonders sometimes whether it was necessary to append the article. A summary at the end will meet the requirements. A title, though brief, may yet convey clearly the subject under discussion. Remember, the title is to be indexed. If it is not properly expressive the paper concerned might as well be consigned to oblivion.

Further, we deprecate the practice of writing in a "telegraphic" style. This may be all right in a hospital case report, but is not all right in a medical periodical that has any pretensions. Leaving out the definite article is the most flagrant example of this fault. Do not take the daily newspapers as your model.

We ask our prospective contributors to think on these things. And remember, oh remember, to double space your articles. A.G.N.

The History of the Canadian Medical Association

By H. E. MacDermot, M.D., F.R.C.P.(C.)

Two events of great importance to Canada occurred in 1867— (1) Canada became a nation; and, (2) The Canadian Medical Association was founded. Throughout the intervening years the Association has attempted, albeit sometimes feebly, but always courageously, to perpetuate the ideals and to accept the challenge laid down by its founders.

Sixty-eight years ago Sir Charles Tupper declared the corner stone of the organization well and truly laid, as is recorded in the Minutes, and, happily, from that day to this the records of the Association are complete, disclosing in their pages the story of medical progress, the cavalcade of medical events, the interesting adventures of unselfish men and women.

Dr. MacDermot has discharged his task most creditably indeed. A facile pen, an easy style, an ability to sift facts, together with the historian's flair to recreate scenes and actions, all enter into this splendid volume.

The book is divided into two parts and sixteen chapters. Its 209 pages are filled with information and interest. Starting with conditions of medical practice in Canada prior to 1867, the author brings us forward over the years to our re-organization following the Great War. The more recent events he leaves to future historians who may view them with the advantages born of retrospection.

And a word about the printer's achievement. The book is bound in red cloth with gold lettering. The type is large enough to be easily read. The volume is attractively in keeping with its contents. It should find a place among the most interesting books in a medical library.

The price is $3.00. Orders should be sent to the General Secretary, Dr. T. C. Routley, 184 College Street, Toronto.

Transgression by whomsoever committed is blamable, but more so in learned men, because learning is a weapon for combating Satan, and when the possessor of a weapon is made prisoner, his shame will be the greater. It is better to be an ignorant poor fellow than a learned man who is not abstemious. The former loses the way by his blindness; the latter falls into a well with both eyes open.—*Maxim LXVI* of the Sheik Sa'di of Shiraz.

It seems to me that death is always untimely and premature when it comes to those men who are engaged on some immortal work. For those who live from day to day entirely given over to pleasure terminate the purpose of their life with the close of each day; but those who think of posterity and strive to win an undying fame by good works, to such death is always premature, for it cuts them off in the midst of some task that they have undertaken.—Pliny the Younger.

Retrospect

TRACHOMA: A RETROSPECT*

By JOHN V. V. NICHOLLS,

Montreal

Recently, DR. MELVILLE D. MACKENZIE has prepared for the Health Section of the League of Nations' Secretariat a very exhaustive and well documented report on the advances in our knowledge of trachoma during the past five years. It has been thought that because of the great and growing importance of this baffling disease a summarized account of it will be of value.

MACKENZIE first points out the difficulty of studying this subject without a good definition of the disease. He considers that of CUÉNOD to be the best— "Trachoma is a specific contagious chronic affection localized to the conjunctiva of man and characterized essentially by numerous small follicular new formations appearing on the surface of the mucosa of the superior edge of the tarsus, whence they may spread. The new formations develop slowly, accompanied commonly by superadded mixed infections, but in pure state producing a hardly perceptible inflammatory reaction. In either case the process tends to atrophy of the mucosa and of the submucosa, which shows itself in the form of cicatricial tracts on the tarsus."

The difficulties attendant on the study of this disease, in addition to those of definition, diagnosis, and determining the incidence are increased by the facts that it is transmissible only to certain species of monkeys and that it is usually complicated by secondary infections. Prophylaxis, too, is difficult because trachoma occurs mostly among poor and ignorant people.

One of the great difficulties in determining the incidence of trachoma is the lack of a good definition, as suggested above. MACCALLAN'S classification is widely used and its general adoption has been urged by many. MACKENZIE believes that a survey can be properly carried out only by specially trained ophthalmologists. It is generally agreed that compulsory notification and figures based on the estimated amount of blindness are of little value. The tendency is to base estimates on (*a*) school statistics (the most satisfactory way); (*b*) army recruiting; and (*c*) examination of samples of the population. MACCALLAN sounds a warning note about accepting school statistics, though he thinks it is the soundest method. In Egypt only the better class children go to school and so the more contagious and serious types of the affection diminish from the first to the fourth year, and, further, a large number of people in trachoma countries become infected with a mild form of the disease which clears up without complication.

MIYASHITA, in Japan, quotes some interesting statistics from recruiting figures and from the examination of school children. According to the Provincial Governors' reports occurrence is 9.7 per cent in men and 10.1 per cent in women; recruiting figures are 12.66 per cent; those obtained by the examination of school children are 13.2 per cent in boys and 14.94 per cent in girls.

One of the most striking features in the incidence of trachoma is the wide variation in the amount of the disease, not only in different countries but within different localities. This has been pointed out by BONNET in Algeria, FOLEY in north Africa, MAGGIORI in Italy, MIYASHITA in Japan, BARGY in Cochin China, and RAGANEAU in Latakia. MACCALLAN believes that there is very little difference between the sexes as to incidence, but that women suffer more severely. He mentions that customs favour the spread of the disease, one of them being the blackening of the eyelids with antimony sulphide or kohl. The instrument used for this purpose is used by all the household.

With regard to age incidence ROSTKOWSKI gives an analysis covering 3,387 trachomatous patients. Under 20 years of age the disease occurs in 32 per cent; between 20 and 40 years, in 30 per cent; and above 40 years, in 38 per cent. The frequency of complications increases as the age increases. The figures for those in the above groups are 7 per cent, 30 per cent, and 50 per cent, respectively.

WALL, writing of the Indians of western Canada, states that trachoma exists chiefly in the central and southern prairie regions and in the eastern and central parts of British Columbia. He believes that the disease has existed among the Indians for a long time, though it may have been introduced by settlers, and that the increase in the incidence of the disease is due to the change in their habits. He regards the infection as almost entirely the blame of the mothers, who use their head-dresses as handkerchiefs to wipe the eyes and noses of their children, irrespective of whether they be healthy or not.

Notes on the distribution of trachoma in the United States, emphasizing the different climatic condition under which the disease is prevalent, have been published by MCMULLEN and RICE. These writers state that the endemic zone extends from the Alleghany Mountains to the eastern frontiers of Kansas and Oklahoma. It appears, therefore, on the whole, that climate

* Epidemiological Report of the Health Section of the Secretariat, League of Nations. Trachoma. Geneva, 1935.

plays but little part. MACCALLAN, in Egypt, has stressed the importance of variation in temperature.

Infection with trachoma occurs mostly during infancy, and school plays little or no part. This statement has been emphasized by MCMULLEN and RICE, in the United States, MIYASHITA, in Japan, and by TALBOT, MORAX and SHOUSBOE. The last two authorities make the following observations: (1) Trachoma occurs before school age. The most active cases occur among the youngest children. (2) The origin of the disease is familial. (3) Infection at school does not seem to play an important part. SCHOUSBOE, after a careful study by means of graphs of the age-grouping of children in relation to the incidence of the disease in the mothers, has reached the conclusion that infection occurs during the first few months of life (45 per cent up to two years) through the mother and other members of the family. Infection is continued and increased by extra-familial infection, in which school infection is of little importance, until at six years of age 70 per cent are infected.

BARGY, REDSLOB, LANGEMANN and ROSTKOWSKI have recently published papers which show that a relative immunity to trachoma exists among certain races, which, at any rate, persists for a certain time after the arrival of heavily infected immigrants or after the transference of a healthy stock into an infected area.

Many difficulties beset the question of etiology. There is the lack of agreement about definition and the relation of trachoma to common infectious conjunctivitis. ROSTKOWSKI has referred to persons who have an excessive development of adenoid tissue throughout the body, including the follicles in the conjunctiva. Follicular conjunctivitis is not uncommon in such persons, leading to difficulties in diagnosis.

Investigations as to etiological agents have mostly been limited to (1) the possible relationship of the Prowazek-Halberstaedter inclusion-bodies; (2) the possibility of the *B. granulosis* of Noguchi being the cause; (3) the transmissibility of the disease from man to man; (4) the transmissibility of the disease from man to monkey, or from monkey to monkey, either through inoculation with trachomatous material or with *B. granulosis;* (5) the value of TRICOIRE'S reaction; and (6) the filterable properties of trachoma virus.

As to the first, it is generally agreed that these bodies occur in epithelial cells-nest as inclusions, and that they are more numerous in the earlier stages. Their distribution is irregular and the bodies have not been cultivated. The question whether all the workers have been dealing with true Prowazek-Halberstaedter inclusion bodies has been raised by AFANASSIEVA and THYGESON. Many have stressed the importance of finding these bodies for the correct diagnosing of the disease, among them TAVORISKY, THYGESON, FASSELOVA and WILSON. However, this view is not endorsed by all. AUST suggests that the Prowazek-Halberstaedter bodies are not specific and do not represent the causative parasite, but are merely appearances due to cell modification.

A large amount of work has been done during the past five years in connection with the possibility of *B. granulosis* being the specific cause of trachoma. THYGESON has summarized the points on which Noguchi based his conviction that his organism was the cause: (1) the isolation of the bacillus in four out of five cases examined; (2) the probable identity of the trachoma of Indians and that of white people; (3) the causation by inoculation with *B. granulosis* in certain monkeys of a granular conjunctivitis resembling trachoma in man and apparently identical with the disease produced in monkeys by inoculation of material from human cases of trachoma; (4) the transmission of the experimental disease to six successive animals; and (5) the recovery of *B. granulosis* from animals infected by inoculation with *B. granulosis,* and the demonstration of the bacilli in sections and smears from human and animal cases of the disease, and the likeness of the histological lesions of the experimental illness to those of human trachoma. Since Noguchi's death a large amount of work has been done on this subject which, in general, tends to throw doubt on his contention. MORAX concludes that *B. granulosis* is not the specific cause. He was never able to isolate it from trachomatous Algerians. Many other workers also support this point of view, and, following Noguchi's technique, have not been able to duplicate his results. The work of BENGSTON (1932), FISCHER-ASCHER (1931), WILSON (1931), THYGESON (1933), TRANG (1930), CATTANEO (1931), PUSCARIU and MITZULESCU (1932) leads to the same conclusion. OLITSKY, KNUTH, and TYLER'S work (1931) suggests that the cause of trachoma is not filterable. Agglutination experiments have been described by WEISS (1933) and THYGESON (1933) suggesting, generally speaking, that *B. granulosis* gave agglutination more regularly and in less concentration with the sera from trachomatous patients. However, in a number of cases agglutination was not produced by trachoma serum, and, conversely, agglutination did occur occasionally with the serum of non-trachomatous persons. MIKAELIAN (1931) concludes that *B. granulosis* does not give a specific intradermal reaction in trachomatous patients.

MICHALI *and* VANCEA (1931) report on the inoculation of a number of human volunteers. They found that the incubation period of trachoma varied from five to seven days. They compare and contrast the experimental and natural forms of the disease.

A number of papers have been published dealing with the immunity produced by trach-

oma. LUMBROSO and NICOLLE (1933), among these investigators, have found that there is little or no immunity even in those cases which have gone on to cicatrization. CATTANEO'S work is in agreement. ADDARIS (1931) believes he has produced trachoma by the inoculation of one eye of a blind man with *B. granulosis*. On the other hand, THYGESON'S experiments (1933) gave absolutely contrary results.

Investigators, generally, are agreed that great caution is necessary in the interpretation of the results obtained from animal inoculations in connection with trachoma work. So far as is known only monkeys are susceptible to trachoma, but the occurrence of a spontaneous follicular conjunctivitis in these animals confuses the issue, which leads many observers to discredit the results obtained from animal experimentation. Many workers, notably, WILSON (1929), OLITSKY and TYLER (1933), NICOLLE and LUMBROSO (1933), and HESS and ROMER have studied forms of spontaneous follicular conjunctivitis in monkeys. The *B. granulosis* has never been isolated from these cases. OLITSKY, SYVERTON and TYLER (1933) have described a new organism, *B. simiæ*, which causes a follicular conjunctivitis indistinguishable from the naturally acquired affection. OLITSKY, KNUTTI and TYLER (1931) inoculated rhesus monkeys with material from cases of trachoma. They obtained *B. granulosis* in 6 out of 11 cases supplying the material and also from the infected monkeys. They also state that a condition closely resembling the follicular stages of human trachoma can be obtained by the sub-conjunctival inoculation in monkeys of material taken from human trachoma, from monkeys with the experimental disease, and with cultures of *B. granulosis*. The results of TILDEN and TYLER are in agreement, as are those of FISCHER-ASCHER and of THYGESON. At the moment a case can be made out for the specificity of Noguchi's organism in trachoma, though the spontaneous follicular conjunctivitis of monkeys seems to be another affection altogether.

TRICOIRE (1923) described a skin reaction in trachomatous patients produced by intradermal injection of a solution prepared by triturating trachomatous granulations in physiological saline. MIKAELIAN concluded that this reaction was positive in 68 per cent of trachoma cases. BELLOT and SÉDAN obtained similar results. But it appears that tuberculous and syphilitic patients also reacted positively. BELLOT, in further studies (1931) concludes that the test is of no great value, as do also MEDVEDER and ZABOTINSKAJA.

The principles hitherto underlying the treatment of trachoma remain to a great extent unaltered, and the large amount of experimental work done in connection with various possible remedies during the past five years goes to show that no really satisfactory treatment has so far been devised. The application of copper sulphate or silver nitrate seems still to be the most generally accepted routine treatment. There is a definite cleavage of opinion as to the specific action of chaulmoogra oil, as also about Jacobson's solution (benzyl-cinnamic ester) and Stastnick's treatment (the intravenous injection of copper salts). The use of salts of mercury has been urged by many. Not a few other treatments have been studied, such as carbon dioxide snow, bismuth, iodine, acetic acid, sodium chloride, yatoconin, jequirity, jequiritol, and tracholysin (a combination of glycerophosphate and nucleinate of sodium with phenol).

The value of diathermy has been particularly emphasized by MONBRUN (1929) and PAGÈS (1930). RUATA (1932) has advocated vaccine treatment for trachoma. His vaccines aim to clear up the secondary infections which are always present. His results have been so encouraging that the Italian Public Health Service has adopted his method. ADDARIS (1931) claims good results from the local use of a vaccine made from the original culture of *B. granulosis*. EL-KATTAN (1931) also claims good results from a vaccine made from the trachomatous granulations.

A considerable number of papers have appeared during the past five years dealing with various aspects of the surgical treatment of trachoma. These papers add little that is new. WILDER (1930), BEIGLEMAN (1931), and MOTAIS (1934) deprecate the excessive employment of tarsectomy.

Finally, DR. MACKENZIE gives the various suggestions relative to prophylaxis. This angle of the matter is based on a number of accepted public health principles which recent work has tended to confirm, without, however, advancing anything new.

A DIAGNOSTIC SIGN IN PEPTIC ULCER.—F. Oefelein describes a sign which he has found present in a large series of peptic ulcer patients. The patient lies in the prone position with the arms close to the body. He must be completely relaxed and his mind taken off the test. The muscles of the back are then gently stroked from the periphery towards the spine, or parallel to it, from the seventh to the twelfth thoracic vertebra. In positive cases a unilateral reflex occurs in the back muscles, sometimes extending to the extremities. In gastric ulcer the reflex is usually on the right, in duodenal ulcer on the left side. The reflex is more marked in males than in females, and in young than in old patients. In carefully controlled cases Oefelein found that during improvement of the ulcer the intensity of the reflex diminished, and when healing took place it disappeared altogether. In a large series of healthy persons—nurses and soldiers—the unilateral back reflex occurred only as a great rarity. —*Klin. Woch.*, June 29, 1935, p. 928. Abs. in *Brit. M. J.*

Special Articles

TRAINING IN PSYCHIATRY

BY D. EWEN CAMERON, M.B., CH.B. (GLASG.), D.P.M. (LOND.)

Manitoba Hospital, Brandon, Manitoba

In the remarkable modernization of the mental hospital facilities which has taken place in Canada, particularly during the post-war years, one unit of the mobilization of our forces has been strangely overlooked. It must seem illogical that, while so much money and thought have been expended to procure the best and most modern hospital construction and to obtain the most up-to-date therapeutic equipment, relatively little has been done in regard to the training of the medical personnel who have to utilize the facilities provided. With the possible exception of the training scheme in operation in Ontario, we do not know of any organized effort on the part of the Provincial Mental Hospital Services to undertake the training of junior physicians entering the various mental hospitals, yet even the most superficial acquaintance with modern psychiatric technique and research convinces one that this is a specialty which requires a very definite and fundamental training.

Consider the fact that the public is called upon to expend very considerable yearly sums both in maintenance and in the constant capital outlays occasioned by the fact that the mental hospital population is increasing at over four times that of the general population. Consider too, the fact that a very large proportion of the hospital beds in the country are occupied by the mentally sick, and it becomes a matter of surprise and perhaps ill-deserved congratulation that the general public has not forced us to put our house in order by insisting upon trained men to carry on the work in this specialized field.

There are extenuating circumstances with which we may console ourselves. Foremost among these is undoubtedly the scattered nature of the population and the consequent fact that the mental hospitals are widely separated, so that it is difficult to centralize training facilities. A further serious obstacle is the present system of provincial administration of mental health which has so far prevented the organization of sufficient numbers of mental hospitals to develop a worth-while scheme of psychiatric training for their junior men. Over against these rather depressing statements must be set the fact that the more enterprising and capable men have, for the most part, sought to obtain training in well recognized centres, both on this continent and in Europe. Nevertheless the majority undoubtedly rise to senior positions without experience, save what they may acquire in the course of their duties in their own or other similar hospitals.

I propose briefly to outline what it is now felt a training for psychiatry should consist in, and to follow this by some suggestions as to how this training might be obtainable even with our present disadvantages. Probably the training requirements of the junior physician will be best understood if we consider the different directions in which he tends to evolve as his psychiatric career progresses. These are very simple:—Mental Health, Administration, Clinical Work, and Research. Under the first we have reference to the increasing tendency which mental hospitals are showing to develop around them in their community an associated network of Mental Health Clinics and Mental Health Services. The staffing of these is being carried out, and we believe rightly so, from men experienced (but not too experienced, in the sense of being rutted) in mental hospital work. With regard to the second we have reference to the work falling within the province of the Superintendent, Assistant Superintendent and other administrative officers. With regard to the last two—the clinician and the research man—we have hesitated to separate them, for it is undoubtedly true that where research work is devoid of contact with the actual human problem as seen in the wards its probable fate is sterility. There is an equal lack of doubt that the therapy carried out by the clinical psychiatrist loses much of its force if it is not carried out in the light of urge for further facts. We have believed that there is no irreconcilable difference between the standpoint of the clinical therapeutist and that of the research worker, and over a period of years we have been increasingly successful in arranging the clinical work in such a way that it produces results of such reliability and freedom from variables that it can be utilized in research projects.

Training in these four fundamental aspects of psychiatric work is, of course, best carried out upon the appropriate hospital service. We suggest that the physician's introduction to psychiatry should be made upon the acute service. During his stay here he will acquire a familiarity with the various reaction types and with our present classification. He should, at the same time, realize that classifications, and probably more particularly our own, are largely arbitrary structures. Their chief value is as a shorthand method of condensing our knowledge about phenomena, and where, as in the psychiatric classifications, the phenomena are grouped together much more frequently upon a descriptive than upon a causal basis their value is limited, and, indeed, they are frequently misleading. They must grasp not only the facts of the reaction which are of importance to the

individual but also those which involve his family and his neighbours, such as the transmissibility of the disorder either directly or by inheritance, the likelihood of his readjustment, and his probable future capacity as a parent and as a productive member of the community.

With regard to treatment it is usually particularly necessary to insist upon the value of psychiatric therapeutic measures and upon the influence of the environment, as the physician straight from graduation is almost invariably saturated with the dualistic philosophy which seems to be endemic in medical schools. We would suggest, however, that the study of the more advanced psychiatric therapeutic measures, such as psycho-analysis, should be deferred until his fundamental training is completed. Possibly even of greater importance than the study of the abnormal behaviour of the patient and of the methods of control is the necessity of obtaining an adequate viewpoint as to the nature of the human organism and as to its relationships to the environment. In this regard the medical student is, if anything, more naive than the man in the street. His medical training has so accustomed him to dealing with part functions that he has the greatest difficulty in viewing the organism as a whole. This is still further fostered by the fact that there is even yet much of an inclination to present diseases to him as entities rather than as bodily reactions. In spite of his reputed skepticism you will find, as a rule, that his concepts of the mind are very similar to those of religious thinking; they postulate the mind as being separated in a sharp qualitative manner from the functioning of the rest of the organism. We feel that in this stage of his training his reading must be made broad enough to include not only topics of abnormal behaviour but also the work which is being done in modern psychology and the history of the development of our present psychological concepts. It must be emphasized that, particularly since the introduction of intelligence and personality tests, the demonstration of the conditioned reflexes by Pavlov in animals, and the light which the animal experiments of Lashley and other workers have thrown upon learning and other topics, psychology is rapidly coming to take the same place relative to psychiatry that physiology does to medicine.

It is in the chronic services that we feel that the psychiatrist in training should first become acquainted with occupational therapy and administrative work. The three are intimately related. Under occupational therapy we do not have reference simply to the work which is carried on in the occupational rooms; we have reference to the whole range of activities passing from the purely therapeutic work done in connection with assisting the individual to recover from his mental illnesses by means of occupation, up to the tasks of providing lives for people who are likely to be hospital residents for long periods and bringing such people into production as far as possible. In this connection we would stress the fact, very frequently overlooked, that a great proportion of our hospital population should not be looked upon as patients since they do not require active treatment and supervision, but should rather be looked upon as people who are capable of living much more normal lives than they are usually permitted to do and quite capable of making an economic contribution to the community. It is certain that it will be one of the major tasks of the occupational therapist of the future to bring this considerable proportion of our hospital population back into economic production, either within the hospital or in protected settlements, both in their own interest and to lessen the tremendous burden which their maintenance imposes upon the community.

In connection with administration we suggest that stress should be laid upon the value and purposes of nursing education. The physician should also be familiarized with the modern trends in hospital construction and with dealing with patients in groups. The medico-legal aspects, so far as they concern the function of the hospital, might be taken up at this point, though probably greater familiarity with its relationship to the individual patient will be acquired in the Out-patients' Service. It should be impressed upon the physician at this point in his training that the organization of hospital life for the patient is one of the most valuable therapeutic agents which we possess.

In regard to the training in laboratory and research methods it is to be emphasized that for the younger worker bio-chemistry is coming to take the place that pathological anatomy and neuro-pathology held with his predecessor. We feel that both should have their place in the training of the psychiatrist, and that while he should familiarize himself with the principles and technique of the various bio-chemical procedures used, he should at the same time have an opportunity to undertake post-mortem examinations and to make more detailed studies of the central nervous system. At the same time he should acquire a thorough grasp of experimental procedures in general, There is no more urgent need in psychiatry than the present need for more facts. It is frequently claimed that the research man is born, not made. While this may possibly be true for the very outstanding worker, we may reasonably feel that we have in our hands the power to build up that corps of research workers without whose services the original investigator would be as a general without an army.

Finally, in regard to training in mental hygiene work, we feel that it is opportune at this period to stress our belief that in spite of recent trends it is not a desirable thing that the mental hygiene worker should be devoid of fundamental psychiatric and medical training. It is a matter of some congratulation that in this country we have not as yet seen the tendency, observed elsewhere, to separate these two aspects of psychiatry. The training in the out-patient

department should include a thorough knowledge of the principles and procedures of the intelligence and other personality tests. Reading in child psychology, in social psychology, and in educational literature is essential. The worker should be familiarized with the social service science organizations in his community. He should also be familiarized with the therapeutic procedures and the preventive work carried on in the out-patient clinics.

Having outlined the minimum requirements which training in modern psychiatry demands, we wish to advance a point of view which we are aware is not in harmony with the trend of events at the present time. We propose to discuss the relative claims of the mental hospital as contrasted with the psychiatric institute or psychiatric clinic as a training centre. By mental hospital we have reference to the hospital usually situated in the midst of a community, partly urban, partly rural, the mental health needs of which it supplies. If the hospital is of any long standing its case records will not only be the records of the mentally sick who have passed through its wards but they will also be the record of the welfare of that community. By close scrutiny of those records you can detect the various happenings which have affected the composition, the organization, and the mental health of that community. You may detect the influence of successive immigration waves which have passed over it. It is probable that more careful research than has been carried out thus far would reveal too the influence of the clash of the native and foreign cultures and the partial degradation of both in the second generation in producing mental disorder. You can see something, too, of the effects which changing legal forms have had upon the incidence of alcoholism and drug addiction. The mistakes that the community has made in the business of living may be seen in the number of defectives who have been allowed to propagate themselves. The mistaken ideas which the community has entertained in regard to causation of mental disorder may be seen, for instance, in reference to masturbation in the older files. In many parts of the country the mental hospitals represent the sole organizations which are collecting data in regard to the interaction of individuals and groups and the changing social forms under which they live.

If we are to consider that environment plays any rôle at all in the causation of mental disorder it is in the community that we have to study it. The environment from the point of view of mental health does not only consist in the environment of water, air, food and shelter which preventive medicine has so beneficially altered, but also, and mainly, in the social forms under which we live, the scheme of ethics to which we adhere, and the beliefs by which we are guided. If we hope by emulating preventive medicine to attain to her happy results it is to the careful study of this environment that we must address ourselves. Hence the study of the community is a most essential part of our mental health program and this must of necessity be best carried out in the mental hospital, which is immediately responsive to alterations of the mental well-being of the community, which mirrors its needs and defects, and in the records of which is to be found one of the most intimate accounts of the vicissitudes of the human community which it serves.

By contrast, the psychiatric institute or psychiatric clinic is a specialized organization especially adapted to deal with individual problems, and in its hospital population having little relationship with the vicinity in which it is situated. It is admirably suited, particularly where well endowed with laboratory and library facilities, for research work in a range of problems which, while extensive, do not by any means comprise all those which arise in mental hospital work. In particular it is not possible to grasp the occupational therapy problem in its full implication in the specialized clinic where the hospital population is largely transitory. The necessity which the mental hospital worker finds to provide lives for that great group of people whom we have agreed not to call patients but rather citizens capable of making a reduced contribution to the welfare of the community finds no counterpart in the psychiatric institute. While it is from the institute and clinic that we may expect the specialized research, we feel that it is in the mental hospitals that the man on entering the psychiatric field should acquire his first experience and his fundamental training. It is only in them that he can expect to encounter the whole range of problems and insofar as the vast majority of our hospitalized mentally sick are in the mental hospitals, we must be sufficiently realistic to grasp that the best place for training is in the midst of the field in which by far the greater number of men are later to work.

From our earlier remarks it can be gathered that there is a very considerable need for a well trained medical personnel. We hope that it will also be evident that this training can best be gained in the place where the major problems of psychiatry present themselves; that few mental hospitals are as yet sufficiently well developed to undertake the complete training of their own men. With a view to promoting a discussion upon this very important subject it is proposed to offer some concrete suggestions as to how this training might be organized. It is, of course, to be understood that there are many practical difficulties in the scheme to be outlined, but if in the discussions, favourable or otherwise, an advance is made towards the attainment of a training organization something will indeed have been gained.

In brief it is suggested that we might consider the Dominion as divided for the purpose of training possibilities into zones. The four western provinces fall into a natural group. The populations, with the limited exception of

British Columbia, are of much the same constitution. Consequently you have much the same problems in hospital care, in dealing with the public, and in developing services outside the hospital. Ontario, having twelve mental hospitals, is the only province which is able to attempt to carry on its training within its borders. The work there has been most commendably advanced. It is nevertheless to be pointed out that the larger a training field, the more diversified and therefore efficient the available training facilities. Finally, the Maritimes, either with or without Quebec, seem also to form another natural unit, having similar populations and therefore similar problems. Junior physicians entering the mental hospital services in any of these zones should be under the obligation of undertaking a two-year period of training, during which they would enjoy the status and present emoluments of junior physicians. The training would consist of six-month periods during which, while carrying on their usual duties, special aspects of their work should be given special emphasis and a course of reading on the special topics prescribed. Tentative suggestions are that one of the six-month periods might be devoted to occupational therapy, administration and chronic hospital services; a second period to the work of the admission service; a third to the out-patient service; and a fourth to the laboratory and research procedures. To overcome the difficulty of providing facilities within a particular province it is suggested that the six-month periods of training should be carried out in those of the zone hospitals in which the particular work required was especially well developed. This would have the further advantage of bringing fresh ideas and methods into the hospitals offering their training facilities.

At the end of the two-year period an examination would be held and those successful would obtain the diploma. This should carry with it an increase in salary of, say, $250.00 per year and would render the holder eligible for the post of senior physician. Those who did not possess the diploma would not be eligible for this post. It is further suggested that this examination should be set and supervised by an independent licensing body. Indeed the machinery for this already exists, as the Fellowship examination of the Royal College of Physicians and Surgeons of Canada may be taken in any branch of medicine.

Where posts of senior physician fell vacant in any particular zone all junior physicians in that zone and holding the diploma should be considered as possible applicants, whether in the particular province or not. The present method of practically limiting promotions to the province is a most sterilizing one. It is impossible to consider that, save in very special circumstances, men of capacity and enterprise will enter the provincial services as long as their prospects are limited to the chance of vacancies in the senior ranks of two or three mental hospitals. It is further suggested that, while the task of training may be completed with the expiration of two years, its value to the hospital and its attractiveness to the men entering the specialty of psychiatry will be nullified if the various aspects of their training did not seem to lead on to a career.

The training and experience for those men whose interests are mainly administrative are already well defined and find their culmination in the position of Superintendent. The career of the mental health worker is also becoming more clearly defined and finds its official recognition in the position of Director of Mental Health Clinics and similar terms.

The position of research worker is, however, both obscure and devoid of official recognition. Yet there is no need at present so clamant as the need for further facts. The thorough application of what we already know would undoubtedly affect further improvements in the status and well-being of the patient, but no one could contend that the effects would be very startling. To meet this need it is suggested that there be created in certain hospitals the post of Director of Clinical Investigations. At present the man who is interested in research has when he reaches the grade of senior physician to face the position of remaining permanently at this level or of accepting the post of Superintendent and thereby sacrificing his research interests to the claims of administration. There is no doubt that potentially productive research workers are continually being lost to us through the existence of this dilemma. The post of Director of Clinical Investigations should carry with it the standing and emoluments of Assistant Superintendent or slightly better.

To summarize the situation, there are certain factors about which there can be no question. The more important of these are; that the tremendous growth in psychiatric knowledge and the great diversity of the fields into which psychiatry now penetrates render it impossible for the junior physician entering upon psychiatric work to obtain a sound grasp of even the fundamentals without special training. It is also clear that the community is turning to us for leadership, not merely in the matter of restoring the mentally sick to health but in the campaign for health and more effective ways of living. This leadership can only be given by a personnel that is both trained and experienced. With regard to the other issues which we have discussed, namely, the value of the mental hospital system as a training organization and the practical suggestions made as to the inauguration of training in the Dominion, these, we freely admit, are issues for discussion and question. Indeed, we again hasten to emphasize that they are put forward as a stimulus to that interest and criticism, out of which something concrete may be evolved, and not necessarily as a basis for action.

Men and Books

A HISTORY OF EMBRYOLOGY*

(A REVIEW)

BY MAUDE E. ABBOTT,

Montreal

This outstanding contribution to the history of science first appeared, in less extended form, as a part of the historical introduction to Dr. Needham's monumental work on "Chemical Embryology" published in 1931, and its content was embodied also in a series of lectures delivered by him about that time at the University of London, entitled "Speculation, Observation and Experiment, as illustrated by the History of Embryology". The book, amplified to its present form from the above source, is the first really exhaustive treatise ever published in its field. As such it is of fundamental importance, for it presents a critical evaluation of the successive contributions made to our understanding of this, the most intriguing of all mysteries, from the first glimmerings of speculation into the nature of generation made in antiquity, to the observations of the great biologists of the 16th, 17th and 18th centuries. The account closes in the year 1800 A.D.; for the new methods of quantitative physico-chemical experimentation and anatomical reconstruction developed in the nineteenth century opened up fresh paths of enquiry and unlocked many complex problems for solution that have resulted in a vast material necessitating a second publication, which is now, we are told, under preparation.

In the volume before us contemporary events and individuals of significance are reviewed in broad historical perspective with the help of two graphic chronological charts, original with the author, covering the periods from 600 B.C. to 600 A.D., and from 1450 to 1800 A.D. The hiatus between the two corresponding to the cessation of creative work in this subject that took place in the pre-Renaissance period under the influence of the so-called "Patristic writers". This treatment, and the wide cultural background and depth of personal research through which the writer has approached a field of work that is to him of absorbing interest, make the sequence of ideas here portrayed a very fascinatting survey. One is surprised also to find how closely the progress of this enquiry is interwoven with the history of philosophy itself, for nearly all the great thinkers of the past, as well as the leaders of medicine, have contributed their quota to the understanding of it, or, unfortunately, have in some cases ministered by their misinterpretations to a retardation of ideas that has held back the advance of civilization itself, sometimes for many centuries. As witness, the belief, long since proved erroneous, in the passive part taken by the female element in conception; the theory of pre-formation or pre-existence of parts in the embryo; and the so-called "theological embryology" which trammelled scientific thought in many quarters until the end of the 18th century. Indeed, one of the most important features of this work is the extreme clarity with which its author emphasizes the nature and the value of the various contributions made, so that the very errors that have not infrequently obscured the conclusions of even the greatest writers are held up for the encouragement as well as for the warning of those workers of today who are striving to follow in their footsteps in a spirit of true scientific humility.

Emphasis is further laid on the fact that practically all the authorities quoted have been consulted in the original, and the few sources not available to the writer are here conspicuously listed. Whenever possible, also, observations referred to are cited verbatim, a point that adds greatly to the interest of the text. Naturally, in this era, before the introduction of exact analytic methods or the invention of the compound microscope and discovery of the laws of optics, advances made were chiefly along morphological lines by direct objective study and dissection; but ever and anon, from the time of the first Hippocratic biologist on, a flash of insight caught the gleam of unknown forces at work in the developing embryo and many far-reaching truths were sensed by the mind of genius long before actual physical or biochemical proof was available.

The following brief citation of some of the main points in the four chapters into which the book is divided will serve to indicate the milestones along the line of progress and the kind and degree of exact knowledge that was attainable by the great thinkers of the periods into which its subject falls.

I. *Embryology in antiquity.* — The artificial incubation of hens' eggs, which has been carried out on a large scale by the Egyptians and Chinese from remote times, possibly as far back as 3000 B.C., is described and figured here, as practised in Egypt at the present day. The facilities for observation so afforded must have early drawn attention to the curious phenomena

* A History of Embryology. By Joseph Needham, Sc.D. Sir William Dunn Reader in Biochemistry in the University of Cambridge. XVIII — 274 pages, 40 illustrations. Price $4.50. Cambridge University Press. 1934.

revealed in the developing chick embryo, and this was the subject of endless speculation in the ancient as well as in the mediæval world. The first systematic investigation of the egg at successive stages of incubation is, however, that recorded by the biological writer in the Hippocratic books (*circa* 400 B.C.) of observations made under the natural method of hatching. After a remarkably suggestive discussion of the causation of development of the embryo on machine-like principles (*i.e.*, modern lines), in which he ascribes the main driving force of its growth to an internal "fire" (a thought corresponding surely to the oxidation of all living matter by chemical action), he ends his morphological description of the developing chick embryo with the following "proof". "Take 20 eggs or more and give them to 2 or 3 hens to incubate, then each day from the second onward till the time of hatching take out an egg, break it and examine it. You will find everything as I say in so far as a bird can resemble a man". "We see here", comments Dr. Needham, "as clearly as possible the beginnings of systematic embryological knowledge, and from this point onwards, through Aristotle, Leonardo, Harvey and von Baer to the current number of the *Archiv f. Entwicklungsmechanik, the line runs as straight as Watling Street*".

The next important step came in the herculean achievements of Aristotle (late 4th century) whose book "On the Generation of Animals" is described here as the first great compendium on this subject and of the same class and type as the modern textbooks of embryology by Balfour and Graham Kerr! As a result of his study of chick embryos at successive stages of incubation from the third day on, and the vast number of dissections made by him of embryos from every sort of animal available to him, he was able to construct a remarkable chart of comparative embryology (reproduced in the book) that laid the foundations of comparative morphology and supplied the framework also for the construction of the science of biology itself. His genius previsioned many modern ideas. Thus in a brilliant discussion of the problem of embryogenesis he recognized the antithesis between the theories of epigenesis or pre-formation (fresh development versus simple unfolding of pre-existent structures) and declared himself in favour of the former viewpoint; and he formulated in his writings views that foreshadowed the modern physico-chemical ideas of causation, such as the action of organic catalysts and the sort of clockwork mechanism that is apparently inherent in the ovum, and observed that in development general precede particular characteristics. A relatively large amount of space and much study has been devoted by our author to a careful estimation of the actual value of Aristotle's immense contribution to posterity, and the conclusion is drawn that the solid ground gained by his wonderful powers of observation and correct deduction far outweigh the effect of the few minor mistakes which naturally crept in to such a huge volume of work; although it is recognized that his insistence upon a biological explanation and Final Cause exerted an unfortunate influence on the progress of science in the hands of the scholastic metaphysicians of later generations, who were not possessed of his penetrating scientific genius and sense of relative values.

A little later than Aristotle the Alexandrian School was at its height (3rd century B.C.), and contributions were made under it to embryology by Herophilus and others, and later from Rome by Soranus (30 A.D.), whose accurate anatomical knowledge is shown in the picture by him of the uterus, the first made and which is figured; and by Galen (150-180 A.D.), whose valuable studies upon the morphology of the embryo were made subservient to his pronounced vitalistic convictions and thus as it were closed the door upon further experimentation for the next thousand years.

II. *Embryology from Galen to the Renaissance.*—The thousand years from the end of the second century A.D. are passed over here in a few pages, as yielding little of permanent importance to the subject. The "theological embryology" of the period is described as having reached its "lowest depths" in the treatises of the Abbess Hildegarde, of Bingen (1098-1190), whose description of the development of the fetus and entrance of the soul into this is embedded in an extraordinary medley of mystic and scientific speculations in which the old "cheese analogy" is brought into play. The Aristotelian tradition was however revived in the work of Albertus Magnus, of Cologne (1206-1290), with whom "the new spirit of investigation leapt into being, and the modern as opposed to the ancient period of embryology" is said to have begun. Noble tribute is paid to the extraordinary genius of Leonardo da Vinci (d. 1519), artist, philosopher, poet, statesman, who ranks also as one of the greatest biologists of all time, whose remarkable perceptive faculty led him, four hundred years in advance of his day, to make the first quantitative observation of embryonic growth, and who is described here as the father of embryology as an exact science, as Aristotle is of this as a branch of natural history. Then came that "encyclopædic group of biologists" of the 16th century, of whom Gesner was one, and among whom may be mentioned Aldrovandus (1522), who was the first after Aristotle to investigate hens' eggs at successive stages of incubation. His disciple Volcher Coiter, who in 1564 at Bologna "ordered 2 broody fowls to be brought and under each of them I caused 23 eggs to be placed, and in the company of these persons" (Aldrovandus and students) "I opened one every day so that we

could see firstly the origin of the veins and secondly what organ is first formed in the animal". . . "Coiter's importance," writes our author, "is that he assisted in the iconography of embryology, which was later to attain its climax in the plates of Fabricius". The latter (1604) was a good comparative anatomist, but drew many mistaken conclusions, which are in part compensated for by his beautiful and accurate drawings of the early chick embryo. The "De Humano Fœtu" of Arantius (1564) was an important book of this period which pointed out that the maternal and fetal vessels do not pass into each other by a free passage. Finally in this period must be mentioned the work of Jacob Rueff (1554) whose book "De Conceptu et Generatione Hominis" shows in a graphic illustration (figured) the Aristotelian idea of mixture of blood coagulum and seed in the uterus resolving after conception into a vascularized outline and finally into the solid form of the completed fetus (figured).

III. *Embryology in the 17th century.*—Here the modern period is now well under way, in the sense that the old conceptions that had dominated ideas were gradually being discarded in the light of a growing empiricism. Among the many names of significance in this field the following must be mentioned: Sir Kenelm Digby (1664), whose "clearly deterministic account of development" gives him a high place in biology, and who stands, in the words of this volume, "in the same relation to embryology as an exact science as does Bacon to science as a whole"; Nathaniel Highmore (1651), who first treated embryology from the anatomistic standpoint; Sir Thomas Browne, of revered memory, in whose "elaboratory" at Norwich the first experiments in chemical embryology were carried out; William Harvey himself, whose great work "De Generatione Animalium", the fruit of extensive investigations into the king's parturient does and hinds is second only in importance to his "De Motu Cordis", in that in it he expounded his pet doctrine of *omne vivum ex ovo* and declared against spontaneous generation, decided in favour of epigenesis (fresh development from inherent properties without pre-existing parts), destroyed for ever the mistaken theories of conception based on the teachings of Aristotle and figured by de Rueff (*vide supra*) and performed many services ably summarized here for the clearer understanding of this subject; Descartes (1662), in whose treatise on the formation of the fetus is said to have lurked, in spite of his mistakes, the vital spark that lay at the root of modern physico-chemical embryology; and Walter Needham (1667), described here as the founder of the dynamic aspect of embryology, as Sir Thomas Browne was of the static. So also de Graaf and Swammerdam, who discovered the follicles in the mammalian ovary in 1672, over a century before von Baer described the human ovum itself; Marcello Malpighi, whose beautiful reproductions of the early chick embryo as seen under the simple microscope pushed these observations back to the first hours of incubation; John Mayow, whose studies in fetal respiration were the first great contribution to physiological embryology; and Leeuwenhoek, who in 1677 discovered spermatozoa.

IV. *Embryology in the 18th century.*—This last chapter opens with an interesting classification of the various theories of nutrition, with name and date of the exponents of each. Among the great leaders of scientific thought who occupied themselves with embryogenesis in this period were: Herman Boerhaave, who gives in the second book of his "Elementa Chymiæ" the most detailed account of chemical embryology that had yet appeared, treated from the thoroughly modern standpoint and describing in great detail the biochemistry of the incubated egg; Albrecht von Haller, Boerhaave's greatest pupil, who published in 1767 a volume of his own collected papers on embryology, most of which were concerned with the development of the heart of the chick, and whose most original and fundamental work in this field was on the estimation of the rate of growth of the fetal bones (figured); Caspar Friedrich Wolff, whose extensive experimental work especially on the development of the intestine ruined the preformation theory and established that of epigenesis; and William and John Hunter, authorities upon the circulation of the placenta and other points.

A word regarding the many illustrations with which the book is enriched. These have been carefully chosen and so are of great assistance in the elucidation of the text. Most delightful is the page from Leonardo's note book showing his exquisite portrayal of the fetus *in utero* surrounded with small pencil sketches suggestive of his mechanistic explanation of the course of events in pregnancy and parturition; Malpighi's beautiful drawings of the chick embryo, at 85 hours' incubation, with the heart at this stage, the sinus venosus and aortic arches figured in separate detail; and the frontispiece of Harvey's "De Generatione Animalium" with Zeus liberating living beings from an egg which bears the inscription *Ex ovo omnia.* Others of equal interest are: a page from Nathaniel Highmore's "History of Generation" (1651) showing the development of the bean and indicating the analogy between this and the growth of the chick embryo; the facsimile of a page from von Haller's "Elementa Physiologia" (1766) presenting his observations on the growth in length and increase in weight from day to day of the embryonic long bones of the chick; Réaumur's illustrations of his famous incubators, specially invented by him for the artificial hatching of eggs; Buffon and his friends studying mammalian generation; and last, but not least, the

exquisite picture of Dr. Thomas Browne and his wife Dorothy, along with eight other portraits.

Enough has been said to indicate the very exceptional character of this fascinating and inspiring book, which will be perused with avidity alike by the research worker and the student of history and also, we believe, by the general reader. Its great interest springs not alone from the bearing which its content has upon the history of human thought, but also from the author's intimate familiarity with every part of his many sided subject, so that he has been able of his own depth of knowledge to eliminate inconsequent details and to bring to his treatment of it a vivid freshness of thought that makes his story of the past a vital part of the living present and through this of the unknown future—*And this is history.*

Association Notes

The Meeting at Atlantic City

SECTION ON OPHTHALMOLOGY

This Section convened on June 12th under the joint chairmanship of Dr. W. Gordon M. Byers, Montreal, for Canada, and of Dr. Arthur J. Bedell, Albany, N.Y., for the United States.

Dr. Byers extended greetings from Canada.

Dr. Bedell spoke on "Stereoscopic Fundus Photography".

The following papers were read.

Papillœdema and Optic Neuritis: A Retrospect.—MR. LESLIE PATON, London, England.

Inflammatory Exophthalmos in Catarrhal Disorders of the Accessory Sinuses.—DR. M. COHEN, New York.

Inflammatory exophthalmos is a term applied to cases of exophthalmos combined with ocular inflammation in contradistinction to non-inflammatory exophthalmos, as seen in exophthalmic goitre. It is caused by an inflammatory reaction in the retrobulbar tissues. The main cause of this reaction is sinus disease. In the acute or subacute types, without abscess formation, surgical procedures should be avoided owing to the possibility of spreading infection to the cranial cavity and the cavernous sinus. In the prolonged chronic cases the Krönlein operation was performed in order to decompress the orbital contents. A Naffziger operation was also performed in a chronic case, resulting in relief of the condition. Four cases were considered, two of the subacute and two of the chronic type.

Association of Ectopia Lentis with Arachnodactyly.—DR. F. E. BURCH, St. Paul.

The incidence of ectopia lentis with Marfan's syndrome, "arachnodactyly", is proved in 50 per cent of cases. This syndrome is hereditary and familial, characterized by marked growth anomalies with skeletal changes predominant (dolichocephalic skulls, wedged-shaped mandibles and high-arched palates, spinal curvature and flat long chest, with abnormal sternums) and frequent cardiac involvement. The extremities are markedly elongated. Absence of fatty tissue and amyotonia are usual. The disease sometimes resembles gigantism without acromegalic features. That arachnodactyly is accompanied by congenital bilateral subluxation of the crystalline lens is often overlooked. The arachnodactylic phenomena are growth anomalies of mesodermal origin. The associated dehiscence in the suspensory ligament is explained by mesodermic changes in the embryonic vascular tunic of the crystalline lens. The factors that produce these mesoblastic growth changes may be of endocrine origin. The hereditary character may be explained on the chromosomatic basis.

The Treatment of Anisophoria.—DR. J. S. FRIEDENWALD, Baltimore.

Anisophoria, that condition in which the degree of heterophoria varies with the direction of gaze, may be produced by paresis or spasm of the extra-ocular muscles or by the wearing of glasses of markedly unequal power. Partial correction may be achieved by inserting prism segments into the lenses, as in bifocals, by centring the reading glasses differently from the distance glasses, or by tilting the head in reading. Method of more complete correction. If there is no anisophoria, aniseikonia of considerable degree can be tolerated without symptoms, whereas anisophoria without aniseikonia causes severe symptoms. Methods for testing anisophoria with the usual equipment were explained. Lenses on a base curve of —20 dioptres or less and with a thickness of 10 mm. or less will correct as much as 6 degrees of anisophoric variation from the axis to the periphery. For higher degrees of correction two-lens systems are required.

The Causes of Blindness in Children: Their Relation to Preventive Ophthalmology.—DR. C. BERENS, New York.

Data were presented on causes of blindness among 2,702 children in schools for the blind. Outstanding etiological groupings, in order of importance, are (1) congenital and hereditary conditions (51 per cent); (2) infectious diseases (29 per cent), including ophthalmia neonatorum (11 per cent) and syphilis (5 per cent); (3) traumatic and chemical injuries (8 per cent). The study revealed that (1) there is a need for more intensive study of causes, particularly the determination of etiological factors; (2) the schools need more ophthalmological service, which should include corrective operations and treatments as well as examination service; (3) a qualified nurse or medical social worker is needed to assist the ophthalmologist and to do follow-up preventive work with the families of pupils; (4) ophthalmologists should urge that known preventive measures, such as prophylaxis, and medical care for ophthalmia neonatorum, routine Wassermann tests, and adequate treatment for syphilitic patients, be more widely used.

The Pupillary Reactions in Combined Lesions of the Posterior Commissure and of the Pupillodilator Tracts.—DRS. N. P. SCALA, Washington, D.C., and E. A. SPIEGEL, Philadelphia.

The pathogenesis of the Argyll-Robertson pupil was discussed, based on experimental lesions of the midbrain. It was shown that lesions of the posterior commissure diminish but do not abolish the pupillary light reflex. If such injuries are combined with severance of the pupillodilator tracts in the midbrain, slight miosis and a slight impairment of the pupillary reaction to painful or emotional stimuli are observed, but no true Argyll-Robertson pupil results. This phenomenon can-

not therefore be explained by a lesion of the systems mentioned, as various authors write. It was shown that the signs of the Argyll-Robertson pupil can be produced by a lesion of the synapse around the cells of the sphincter nucleus.

Kinetic Stereoscopy or Stereoscopic Phenomena of a Moving Observer.—Dr. A. E. MacDonald, Toronto.

An attempt was made to collect the few scattered references regarding normal phenomena associated with the vision of the moving observer. Dr. MacDonald dealt with muscle imbalance and certain parallactic impressions resulting from these problems and their practical application, especially from the point of view of operators of moving vehicles.

The Virus of Inclusion Conjunctivitis: Further Observations.—Drs. P. Thygeson and W. F. Mengert, Iowa City.

Seven additional cases of inclusion blennorrhœa were reported. The morphology, developmental cycle, staining reactions and biological properties of the virus were considered. The relation to other viruses of large particle size was discussed. The source of infection both of the new-born and of the adult conjunctiva is believed to be a benign endocervicitis in which the virus can be demonstrated by inoculation of the eyes of monkeys and in which inclusion bodies and free elementary virus particles can be seen microscopically. A case of inclusion virus urethritis in the male was reported. The accidental infection of a gynæcologist while performing a cervical repair was described, the resulting disease being typical of swimming pool conjunctivitis. The factors concerned in the epidemiology of swimming pool conjunctivitis were discussed. The value of slit lamp examination of the limbus corneæ in the early differentiation of adult inclusion conjunctivitis from trachoma was emphasized.

Allergy and Cataracts: Deductions Drawn from Clinical Studies.—Dr. Ruby K. Daniel, Rochester, Minn.

The *Anlage* of the human lens, which is demonstrable from the fifteenth to the twentieth day of fetal life, is of ectodermal origin. The capsule develops from embryonic cuticule that is deposited by lens epithelial cells. A sustained level of permeability and selectivity of the capsule, a fine balance of the diffusion processes, and adequate nutrition from the ocular fluids are important factors in efficient metabolism of the lens and the continued maintenance of its transparency. Allergic or immunological factors that change this delicate balance of metabolism can reasonably be held responsible for the origin of otherwise unexplained lens opacities. It is generally known that other structures of ectodermal origin are frequently affected, and there is evidence indicating that the lens is not exempt from the influence of causative agents of demonstrable allergy that may be affecting the skin. The clinical aspects of three cases of cataract with marked atopic eczema in young adults were submitted.

The Control of Myopia.—Dr. E. Jackson, Denver.

Dr. Jackson discussed the results obtained by applying preventive and limiting aids in 381 cases of myopia (755 eyes) seen in private practice, determined with cycloplegia and followed through periods of from two to thirty-nine years, an average of nine and one-half years. They included patients from 4 to 82 years of age, and were grouped and studied according to the age periods at which they came under observation and at which the constant wearing of the full correction was begun. The careful study of myopia is a step toward the prevention of the blindness of later life. It is not yet known to what extent blindness from cataract and retinal separation depend on myopia or how, through the general nutrition of the eyes, myopia and glaucoma may be related or opposed to each other. Under 10 years of age the tendency toward myopia is general and in most myopic eyes the defect is increasing. Decreases in myopia do not occur before 10 years of age, but in some patients, placed that early on constant use of the full correction decreases appeared before 20. From that time on about one case of myopia in five showed increase until over 60, and after that about one in three. Such decrease in the amount of myopia corresponds with the increase of hyperopia, found by Priestley Smith in his studies of the growth of the crystalline lens, between 25 and 65 years of age. The increase of vision shown, not the better vision with correcting glasses but vision developing gradually as the glasses were constantly worn, was a matter of surprise. It began at the earliest age, and was found at all periods of life. In early life it might be ascribed to the gradual gain in visual acuity, commonly seen after the correction of astigmatism in young people. But after 30 it was best explained by the general improvement of the nutrition of the eye, with the wearing constantly of glasses that placed it on a footing of equality with the emmetropic eye or with the hyperopic eye not used excessively for near work. The small proportion of eyes in which vision decreased, not more than one in four, even after middle life, should dispel the idea that nothing can be done to control myopia and preserve the usefulness of myopic eyes. Myopia can be controlled by removing its causes and securing the essential conditions for healthy eye work.

Herpes Ophthalmicus:

I. Radiotherapy in Herpes Zoster Ophthalmicus and Herpetic Keratitis.—Dr. Francois Badeaux, Montreal.

This paper was presented for the sole purpose of drawing attention to the excellent results obtained with x-rays in the treatment of herpes zoster and herpetic keratitis. The author first briefly reviewed the various treatments previously recommended for these conditions and then dealt with the dosage and dangers in roentgen therapy. A series of case reports concluded the contribution.

II. Herpes Corneæ, with Special Reference to Its Treatment with Tincture of Iodine.—Dr. T. Gundersen, Boston.

A study of 200 cases of dendritic keratitis was reported. The majority had been verified by rabbit inoculation. A statistical analysis was made regarding sex, age, seasonal incidence, incidence of recurrence and the relationship of trauma, acute infection and presence of herpes simplex elsewhere. Various forms of treatment had been tried, including the use of ultraviolet rays, hydrogen dioxide, acids, epinephrine, simple curettage and tincture of iodine. Particular attention had been given to treatment with tincture of iodine, and this had been found to be the most effective. Its success was believed to be due to the destruction of the tissue itself in which the infecting agent multiplies. Without tissue destruction no cure could be effected. Previous failures with this treatment have been due to inadequate application of tincture of iodine. Tincture of iodine itself does not increase corneal scarring. The chronic form of herpes corneæ, keratitis metaherpetica, were given especial consideration.

Intracapsular Extraction in the Average Practice: Report of One Hundred Cases.—Drs. S. J. Beach and W. R. McAdams, Portland, Me.

This report was presented to oppose the common assumption that this operation is too hazardous for

performance outside the large clinics. This belief, by discouraging the general adoption of intracapsular extraction, works a hardship to those incapacitated by immature cataract, for whom no other operation has gained favour. The results compare favourably with those reported from the larger centres. If there is any greater operative risk than with the orthodox capsulotomy technique it seems more than offset by the rapidity and smoothness of the recovery.

Artificial Fever Therapy of Ocular Syphilis. —DR. A. M. CULLER, Dayton, O.

Fifty-five patients with ocular syphilis had been treated with artificial fever therapy (Kettering hypertherm) combined with anti-syphilitic chemotherapy. Most of these patients had not responded to the usual forms of anti-syphilitic therapy. Each patient received approximately ten weekly treatments, each of five or more hours, at 105° F. or above. The average interval of observation was twenty-two months. Included in this series were patients with the following ocular complications of syphilis; extra-ocular palsies, interstitial keratitis, Argyll-Robertson pupils, exudative uveitis, gumma of the iris, choroiditis, neuritis and neuroretinitis, and optic atrophy. Those patients with acute exudative lesions showed prompt clinical response. The varying results in the other groups were analyzed.

Trainor Operation for Lid Ptosis. DR. M. E. TRAINOR, Los Angeles.

Ptosis is a condition in which there is a drooping of the upper lid. It may be congenital or acquired. Operative intervention is indicated in either congenital or acquired ptosis. Fifty-five operations have been devised for the correction of this condition. Ten years ago the author became dissatisfied with the results obtained with those which he had tried. He believed it possible to get a pulley-acting connection between the lid and the eyeball. To obtain this he used the superior border of the fibrous plate of the upper lid and the superior rectus muscle. A strip of the superior border of the tarsus 2 mm. wide by about 10 or 12 mm. long, consisting of fibrous tissue almost completely surrounded by conjunctiva, is separated from the middle half of the superior tarsal border the base of which is in. This strip is pulled under the superior rectus, near its attachment to the eyeball, and its tip stitched into its original attachment.

SECTION ON LARYNGOLOGY, OTOLOGY AND RHINOLOGY

This Section convened on June 12th, under the joint chairmanship of Dr. John J. Shea, of Memphis, Tenn., for the United States, and of Dr. W. J. McNally, of Montreal, for Canada.

Dr. Shea, in his remarks as chairman, dealt with "The Clinical Consideration of the Morphology of the Sinuses". A brief abstract is given herewith.

The morphology of the sinuses reflects the experiences of the paranasal sinuses. The growth of the sinuses is proportionally capsulation and pneumatization, which can be altered by the influence of infection or allergy. The frontal sinus is the best criterion. The maxillary sinus continues to grow throughout life, owing to the thinning of its walls. The sphenoid sinus is the first to complete its pneumatization and the sinus whose cavity is most frequently obliterated.

Dr. McNally's address will be published in full in a later issue of the *Journal*. His subject was "Milestones in the Recent development of our Knowledge of Hearing and Balancing".

Other papers presented were the following.

Carcinoma of the Larynx: A Plea for Conservative Surgery in Certain Cases in Which Laryngectomy Might be Considered Necessary. —MR. NORMAN PATTERSON, London, England.

This paper will be published in full in the February issue of the *Journal*.

Aspects of Mineral Metabolism.—DR. D. L. THOMSON, Montreal.

Mineral metabolism concerns otolaryngology in at least two problems: the relation between sodium and Ménière's disease, and the relation between calcium and otosclerosis. A short review of modern concepts in the field of mineral metabolism was presented, with special reference to the interrelations of mineral metabolism, acid-base balance and irritability, and to the controlling influence of the endocrine glands on mineral metabolism.

A Study of Clinical Cases with Vertigo as a Cardinal Symptom. — DR. J. B. MCMURRAY, Washington, Pa.

This study was based on an analysis of 150 cases of vertigo. A general physical examination had been made as well as hearing and labyrinth tests. The large percentage of the cases presented a true vertigo.

Neoplasms Involving the Middle Ear.—DR. L. A. SCHALL, Boston.

A presentation of six cases of neoplasms involving the middle ear, divided as follows: basal-cell carcinoma two, adenocarcinoma one, epidermoid carcinoma (grade 4) one, hemangio-endothelioma two. It was the author's opinion that the origin of the malignant growth beyond the isthmus cannot be determined clinically and that it should be treated as involving the middle ear. In these cases the author advised (1) removal of the entire membranous external auditory canal and the concha; (2) radical mastoidectomy; and (3) radiation in sufficient dosage to destroy the tumour without producing excessive bone necrosis or cerebral damage. Five out of six patients are alive with no evidence of recurrence for periods varying from two to more than four years. Insufficient time had elapsed for proper estimation of the final results, but sufficient time had elapsed to realize that early diagnosis and proper treatment convert this type of case from a hopeless to a hopeful problem.

The Pædiatric View of Otolaryngology.—DR. E. C. MITCHELL, Memphis, Tenn.

Infection of the upper respiratory tract is prevalent in children throughout the entire year, but from October 1 to May 1 more than half the little patients suffer from this condition. A large number of diarrhœas in children are parenteral. In addition, many children suffer from pyelitis, nephritis, secondary anæmias, malnutrition and other infections. The original focus of infection is the tonsil, adenoid, paranasal sinuses, ears or mastoids. The chief complaint is often not referable to the upper respiratory tract and is found only after careful investigation. The most difficult problem in childhood tuberculosis is to differentiate from paranasal sinus infection. The pædiatrician needs the otolaryngologist for consultation and for treatment when necessary. The otolaryngologist needs the pædiatrician because often the failure to correct upper respiratory involvement is due to improper general care of the case.

The Hormone Factors Involved in the Evolution, Development and Growth of the Paranasal Sinuses.—DR. H. MORTIMER, Montreal.

In a four-year study of factors concerned in the production of abnormal growth, with disturbance of structure and form in the human and the animal cranium, it has become evident that the paranasal sinuses are markedly affected in dysplastic processes. Experimental hypophysectomy in animals has a profound effect on the growth and development of the sinuses, and defects thus produced can be rectified by highly purified hormone fractions extracted from the anterior hypophysis. By this means cranial dysplasias can be produced experimentally in animals, similar to those in man, particularly those found in frequent association with pathological conditions of interest to the otolaryngologist. The evolution of those sinuses in the primates depends on the mode of growth of the component bones of the face, as dictated by the habits and needs of the species, and arises incidentally to that basic mode of bone growth, not as purposeful nasal accessories.

Bone Proliferation in Accessory Sinuses: A Pathological Study.—DR. GREGOR W. MCGREGOR, Toronto.

This paper will be published in full in a later issue of the *Journal*.

The Relationship of Bronchiectasis to Paranasal Sinus Infection.—DR. G. E. HODGE, Montreal.

The association of pulmonary suppuration with chronic nasal sinusitis has been frequently noted. Statistics from various centres have shown this relationship to be extremely common. Chronic sinusitis and the factors associated with its development are fairly well understood, but the etiology of non-tuberculous bronchiectasis is still somewhat obscure. Considerable research in recent years has shown that the changes on the lung associated with bronchiectasis frequently begin in early childhood. Pulmonary damage may occur at that time and afford a suitable soil for the development of secondary infection.

Errors in Interpretation of Roentgenograms in Otolaryngology.—DR. F. M. LAW, New York.

There is a growing tendency for the otolaryngologist to interpret his own films. Therefore it is necessary that he should understand the errors that might arise from faulty technique or those due to anatomical variations. Perfect films are necessary, especially stereoscopic films. A perception of the third dimension will solve many errors due to technique or anatomical variations. The diagnosis of sinus films rests more on the appearance of the sinus walls than on the varying degrees of opacity of the sinus cavities. A knowledge of the x-ray anatomy will often assist in the determination of the course to pursue in operating.

Brucellosis in Otolaryngology.—DR. C. C. CODY, Houston, Texas.

Brucellosis has no specific lesion of the ear, nose and throat but is of interest to the otolaryngologist on account of its capacity to simulate acute mastoiditis, thrombophlebitis of the lateral sinus or jugular vein, and sinusitis. It is another systemic infection the recognition of which renders the differential diagnosis of these conditions even more accurate than it now is. The need for considering brucellosis arises in patients with fever of uncertain origin and in atypical cases.

Contact Ulcer of the Larynx.—DRS. CHEVALIER JACKSON and CHEVALIER L. JACKSON, Philadelphia.

Contact ulcer is a distinct morbid entity with a characteristic etiological and pathological basis. It is curable in all cases if its distinctive character is recognized and treatment based thereon is instituted and strictly maintained for a sufficient length of time. Otherwise it will persist indefinitely and the voice will become permanently impaired. Malignant disease of the larynx is a very rare sequel.

The Diagnosis and Differential Diagnostic Data of Specific Types of Suppuration in the Petrosal Pyramid.—DR. S. J. KOPETZKY, New York.

The literature on the subject of petrositis has increased to the extent that a clarification of the elements of diagnosis is essential. A basis for a more exact nomenclature was presented. The salient points in the diagnosis of the various types and locations of suppurative lesions in the petrosa was stressed. The differential diagnosis from lesions that may simulate the symptom complex of petrositis, either in whole or in part, were detailed.

Tuberculosis of the Larynx Requiring Tracheotomy.—DR. M. C. MYERSON, New York.

Several phases of laryngeal tuberculosis that are concerned in tracheotomy are poorly understood. An attempt was made to clarify the subject of tuberculosis of the larynx as it relates to tracheotomy. A number of interesting and instructive experiences were cited.

SECTION ON DERMATOLOGY AND SYPHILOLOGY

This Section convened on June 12th, under the joint chairmanship of Dr. Jeffrey C. Michael, of Houston, Texas, for the United States, and of Dr. J. F. Burgess, of Montreal, for Canada.

Dr. Michael's address was entitled "A Consideration of the more Important Questions in the Etiology and Therapy of Acne Vulgaris". Dr. Burgess's subject was "Chronic Glanders in Man". His paper will be published in a later issue of the *Journal*. Abstracts of other papers follow.

The So-Called Mosaic Fungus as an Intercellular Deposit of Cholesterol Crystals.—DRS. A. M. DAVIDSON and P. H. GREGORY, Winnipeg.

This paper will appear in a later issue of the *Journal*.

Rosacea Interpreted as a Bacteride from Focal Infection.—DRS. H. FEIT, E. LASZLO and F. VERO, New York.

This was a study of 50 cases. Dental infections were found in 18, sinus infection in 8, tonsillitis in 9 and otitis media in 2. In 18 cases, treatment of such foci resulted in cure in 11, improvement in 6 and no change in 1. Skin reactions to streptococcus and staphylococcus toxins were found in a significant number of cases. These observations indicated that certain cases of rosacea, especially those of the pustular type, were due to local infection and might be interpreted as due to allergic reactions to bacteria (bacterides).

Lichen Simplex Chronicus.—DR. D. E. H. CLEVELAND, Vancouver.

Cases were analyzed and commented on under the headings of age, sex, complexion, location and number of lesions, history of injury, pre-eruptive pruritus,

habits (dietary and others). personal history of allergic phenomena, family history of allergic phenomena, occupation, accompanying cutaneous or other diseases, accompanying functional or organic nervous diseases, and methods and results of treatment. The author was opposed to the terms neurodermite, neurodermitis or neurodermatitis, as implying a neurogenic etiology, and favoured lichen simplex chronicus, as being purely descriptive, for the designation of this disease. He proposed to show from the analysis that allergy, trauma and nervous disorders are the chief etiological factors, but no one of these factors is present in all cases. Views set forth in a paper on the same subject in the *Canadian Medical Association Journal* (1933, **29**: 368) were given statistical support. Treatment by roentgen rays as the method of choice was supported by the figures presented.

An "Office" Technique for Treating Functional Neuroses as Complications of Organic Disease, with Special Reference to the Dermatoneuroses.—Dr. J. H. Stokes, Philadelphia.

Description of a psychotherapeutic technique usable in an office practice, including the mention of the amenable cutaneous conditions; the recognition signs of the various nervous states; the "cathartic" approach; objectifications; guidance; tension release and relaxation; tension discharge; rest, and reconstructive suggestion. Dr. Stokes' method is essentially re-education of the nervous system.

Histogenesis of Aberrant Lesions of Psoriasis.—Drs. P. D. Foster, Los Angeles, and G. M. MacKee, New York.

Psoriasis has been accepted as a clinical and histological entity. The identity of the disease has been conceded. Yet carefully investigated cases of psoriasis have eventuated in other disorders—mycosis fungoides, for instance. At times it is difficult to differentiate clinically between psoriasis and other dermatoses such as eczema, the prefungoid stage of mycosis fungoides, syphilis, lupus erythematosus, generalized superficial epitheliomatosis cutis, pyoderma and other conditions. Not infrequently it is difficult or impossible to make an unequivocal laboratory diagnosis. In many cases of typical psoriasis there are individual lesions that, alone, do not suggest psoriasis. The object of this effort was the clinical and microscopic study of borderline psoriasis, atypical lesions and eruptions, and uncommon and rare examples of the disease, in an attempt to confirm or refute it as an identity and to broaden or narrow the conception of the disease as a clinical and histological entity.

The Treatment of Early and Late Congenital Syphilis in Children: The Results of Treatment in 521 Patients.—Dr. F. R. Smith, Jr., Baltimore.

An analysis of the end-results of treatment in 521 children, followed from two to fifteen years, was presented. The children were kept under treatment for a minimum of a year, receiving twenty-five injections of an arsenic compound and twenty-five of a bismuth preparation, given in alternate courses, amounts varying with age and weight. With the exception of cases in which the nervous system was involved, all manifestations of the disease responded well. Syphilis alone rarely causes death except in babies less than 6 months old who have had no treatment, and in cases in which the nervous system is invaded. Further, death from congenital syphilis is rare in children born of mothers who have had even one course of prenatal treatment. Results of the Wassermann blood test were changed from positive to negative in 77 per cent of the children who received treatment before they were 6 months old. When treatment was delayed until the children were 11 to 15 years old the reaction was reversed in only 16 per cent.

A Study of Dementia Paralytica and Tabes with Reference to Precocious Development.—Dr. D. O. Poth, B. F. Barney and U. J. Wile, Ann Arbor, Mich.

This was a study of 436 cases of dementia paralytica and 378 of tabes, occurring subsequent to acquired infection and observed over the same period of time, with particular reference to the onset of symptoms in young individuals or occurring after a short period of latency. Seventy-seven, or 18 per cent, of those with dementia paralytica, were under 30 years old; a much smaller percentage, only 5.5, of those with locomotor ataxia were under 30. Although young men predominated in all groups, all the patients with dementia paralytica who were not yet 20 were girls. The youngest one seen with the other disease was a girl of 22. In both diseases, there were more women in the younger than in the older group. In the attempt to find out why dementia paralytica develops so much earlier than locomotor ataxia, the authors analyzed their patients' occupations, intellectual backgrounds and nationalities. As to the first two factors, they found little difference between the two diseases, but in the study of national origin they found that native-born youths were more numerous than foreigners among those with dementia paralytica. They also studied the effect of early treatment and the kind of treatment, and came to the conclusion that those who had received poor treatment or no treatment developed both types of disease earlier than those who had received reasonably good treatment. The study brought out in a striking fashion the not infrequent occurrence of these syndromes in age groups not previously noted.

Artificial Fever Therapy of Syphilis.—Dr. W. M. Simpson, Dayton, Ohio.

Evidence that has accrued from the treatment of more than 150 syphilitic patients in the Miami Valley Hospital indicates that artificial fever therapy by physical methods is at least as effective as malaria therapy. The many disadvantages of engrafting one serious disease on another as a therapeutic measure are overcome. Hospitalization is not required. Combined fever therapy and chemotherapy have been given to patients with early syphilis, with results which appear to indicate that this is an effective method for the treatment of early syphilis with a view to the prevention of the disastrous late neurological, vascular and visceral complications. A simplified air conditioned apparatus (Kettering hypertherm) has been devised for fever induction and maintenance. No high frequency currents are employed. With accurate control of air temperature, humidity and velocity, it is possible to elevate the general temperature to 106° F. in one hour or less with safety and optimal comfort to the patient.

A Study of the Comparative Value of Bismuth and Mercury Compounds in the Treatment of Early Syphilis.—Drs. A. B. Cannon and J. H. Robertson, New York.

In an effort to determine the relative efficacy of preparations of bismuth and mercury in the treatment of early syphilis, the authors studied the results obtained with various preparations of each of these drugs on groups of hitherto untreated syphilitic patients, comprising in all about 150 cases. In a certain number of cases, treatment was initiated with mercury or bismuth compounds alone, in order to observe the rate of disappearance of spirochætes from open lesions, and the time required for the primary and secondary

lesions to heal. All patients sooner or later received old arsphenamine, usually in courses alternating with the bismuth or mercury preparation, and this combined treatment was further evaluated on the basis of (1) the reversal of the Wassermann reaction, (2) the effect on the blood picture, (3) the number and type of relapses, (4) the patient's tolerance of the drug, and (5) his general condition while under observation. Results obtained in these more recent studies were compared with those set forth by the authors in previous reports on the value of the different arsphenamines used in conjunction with preparations of bismuth and mercury in the treatment of early syphilis.

Intradermal Test for Chancroids with Sterilized Pus from Chancroidal Buboes.—Drs. H. N. Cole and E. A. Levin, Cleveland.

An intradermal test for chancroidal infection, the Ito-Reeinsterna test, has been in use more or less for ten or fifteen years. It consists in the use of an antigen made of sterilized bacillus Ducrey organisms and of specific antibodies. Similarly to the Frei reaction in lymphogranuloma inguinale, it has been found that uncontaminated pus from a chancroidal bubo, when sterilized, may be employed as a specific intradermal antigen in suspected chancroidal infections. The preparation of the antigen was described. Such antigens have been tried in a group of cases of chancroidal infection, both new and old cases, and in numerous other infections. The test is specific. A chancroidal infection, thirty-four years old, still gives a positive test. Explanations of the mechanism of the test were advanced.

The Balanitides.—Dr. J. F. Madden, St. Paul.

All forms of balanitis were discussed and classified. A detailed description and histological study of the rarer forms were given. Differential diagnosis was stressed. The more uncommon examples of balanitis were given special consideration and there were case reports of erosive and gangrenous balanitis, balanitis specifica, balanitis xerotica obliterans, balanitis in kraurosis penis, erythroplasia, balanitis accompanying fungous infections, and other types. The paper was illustrated with pictures of examples of the less common forms.

Congenital Atrophy of the Skin with Reticular Pigmentation: Report of Two Cases.—Dr. M. F. Engman, Jr., St. Louis.

A detailed report was given of two cases (in brothers) of a rare atrophy of the skin, hair, nails and teeth, in which there was a marked increase in melanin pigment. The pigment was distributed in a reticular, lace-curtain-like network over the body. Histopathological studies were presented. Dopa studies showed increase in dendritic cells in clumps with decrease between. Melanin pigment was found in the upper cutis and in the basal layer in similar clumps with very little pigment between. Atrophy of the epithelium with fibrosis of the cutis was marked.

Fever Therapy of Mycosis Fungoides.—Dr. J. V. Klauder, Philadelphia.

Occasional cases of spontaneous regression of malignant tumours have been reported following attacks of acute infectious diseases, particularly erysipelas. Perhaps in line with these observations are reported cases of improvement and cure of mycosis fungoides following attacks of an acute infectious disease. The literature of such instances was reviewed. These reports motivated employment of fever in treatment of two patients with mycosis fungoides. One patient was inoculated with malaria in December, 1933; fever was produced in the other by means of the air-conditioned fever chamber known as the "Kettering hypertherm." Favourable results were reported.

Coccidioidal Granuloma: Report of Two Cases of a Chronic Hypertrophic Type.—Drs. J. L. Pipkin and C. F. Lehmann, San Antonio, Texas.

The dermatological picture is commonly seen as ulcers and subcutaneous abscesses with secondary systemic involvement; usually bone, glandular or visceral involvement when the skin infection is primary. Two cases which have never ulcerated or exhibited any bone, glandular or systemic invasion were described. The dermic picture was unusual in that the leg and foot were involved and the manifestations were tuberous and papillomatous lesions, intracutaneous nodules, verrucous skin, and marked lymphœdema. The verrucous aspect simulated tuberculosis verrucosa cutis. The organism was found in pus from epidermal abscesses, in the tissue, and isolated in culture. The behaviour of the organism and results of animal inoculation were described. The histological picture mimicked very closely that of tuberculosis verrucosa cutis. The infection in each patient followed injury. Both cases were acquired in Texas. This would indicate that the organism is endemic in this state. The duration in the first patient was fourteen years, and in the second over thirteen.

Hodgkin's Disease of the Scalp.—Dr. N. M. Wrong, Toronto.

The case was reported of a boy, aged 12, who developed a nodule in the left parietal region, which spread and became a firm plaque 10.5 by 7.5 cm., almost void of hair and with fine blood vessels coursing over it. A biopsy was done and the condition was reported by two pathologists as Hodgkin's disease of the skin. The lesion cleared completely after three doses of filtered x-rays and two years later was still absent. Differential diagnosis was discussed and the literature reviewed very briefly.

Depth Dose Measurements for Dermatological Roentgen Therapy.—Drs. G. C. Andrews and C. B. Braestrup, New York.

In most skin diseases that are amenable to roentgen therapy, pathological changes occur in the upper portion of the cutis. Very rarely are these changes over a centimetre in depth. With this in mind one readily appreciates the importance of knowing the depth dose within this portion. The obvious disadvantages of ionization chambers for such measurements made it desirable to develop a more satisfactory method. An apparatus was constructed for determining the depth dose in the upper millimetres by photometric means. The results thus procured were shown on graphs indicating the depth dose with various filters and voltages, as used in dermatological roentgen therapy. The possible influence of the depth dose on the number of roentgens constituting an erythema was discussed.

Granuloma Annulare: Report of Unusual Cases, with Remarks on the Histology of This Condition.—Drs. M. H. Goodman and L. W. Ketron, Baltimore.

A review of the literature with respect to distribution and types of lesions in granuloma annulare was presented. Brief reports were made of two cases of this disease presenting the clinical picture in many respects of an eruption of the type of erythema of toxic origin or bearing a resemblance to erythema annulare centrifugum, Darier. The histology of these cases is typical of granuloma annulare. Remarks were

made on the distinctive histological features and their resemblances to the histology of certain lesions of the rheumatic or toxic group of diseases.

The Relation of the Endocrine System to Dermatology.—DRS. W. O. TEICHMAN and F. J. EICHENLAUB, Washington, D.C.

This paper surveyed the literature, particularly the foreign literature, of the endocrine disturbances in skin diseases under the heading of the various endocrine organs. An account was given of the methods employed in diagnosing endocrine changes and then followed a discussion of the various therapeutic measures and a critical summary.

The Meeting of the British Medical Association at Melbourne

Through the kind offices of the editor of the *British Medical Journal* we are enabled to present our readers with an interesting account of the proceedings of the Annual Meeting at Melbourne, Australia.

On arrival at Sydney the party from England had a very hospitable reception from the New South Wales Branch and the civic authorities, which was much appreciated. On September 9th, the *S.S. Aorangi* pulled quietly alongside the wharf at Melbourne, where a telegram awaited the party conveying best wishes from the Malaya Branch, and a reply of thanks was sent to Dr. J. V. Landor. Many colleagues and friends came aboard, some time elapsing before members had been introduced to their hosts and gone ashore. Then the official party drove off to Menzies Hotel, thence to the general office of the Annual Meeting in the anatomy school of the university, to register and attend to various matters, such as the obtaining of badges and rosettes, and the "Book of Melbourne", along with the usual pamphlets. Of the special handbooks of the Meeting one set out the general and specific programs for the week, another described the many half-day, day, and week-end excursions available. A third publication was a handsome illustrated volume of articles on Melbourne and its history, medicine in Australia, the fauna and flora of the country, and many other interesting subjects.

After registration, the President, Dr. S. Watson Smith, laid a chaplet of laurel leaves, tied with red, white, and blue ribbons, on the Rock within the Shrine of Remembrance with the inscription on a card attached: "From the Over-seas Members of the British Medical Association: In Remembrance". The memorial stands in a commanding position on a hill, and can be seen throughout the whole length of St. Kilda Street. Thereafter the President signed the book and left cards upon Councillor A. G. Wales, Lord Mayor of Melbourne, at the City Hall; Lord Huntingfield, Governor of Victoria, at Government House; and Sir James Barrett, the President-Elect. By 9 a.m. the Ladies' Club at the Oriental Hotel was open. Entertainment and excursions were admirably organized by the Women's Committee for over-seas, inter-State, and country guests.

The first function to attend was a luncheon given by Dr. J. Newman Morris at the Melbourne Club to officers and officials of the Association from over-seas, to meet members of the Federal Council and of the Executive for the Annual Meeting. The luncheon table was profusely decorated with delicate, richly coloured flowers, such as can grow in Australia in the month of September (analogous to March in England); and the function was a very charming one. At 2.15 the Trades and Hobbies Exhibitions were opened by the President-Elect, Sir James Barrett, in the presence of the officials of the exhibition, as well as of many visiting members. The display upon the various stands was both comprehensive and valuable, new preparations, instruments, and apparatus being shown in bewildering number. The Exhibition of Doctors' Hobbies was curious in that there were few similar tastes expressed, some being decidedly odd. Among the hobbies are all forms of sport, in each of which the doctor usually excels; many of these pursuits could not, however, be displayed in a hobbies' exhibition. One medical man breeds cattle, another cultivates a miniature rock garden, another cacti, or newts, or extraordinary fishes. Music is the hobby of several, photography of many. Painting has enthusiastic adherents, and collecting as a hobby is represented in many ways: by old books, pewter, silver, china, medals, and coins, a case of historic signatures, stamps, furniture, and many other objects of interest. In the medical women's section there were all forms of lace and embroidery, the most interesting exhibits being the personal hand-wrought type. Altogether this Hobbies' Exhibition gave an insight into the differing tastes of members, men and women, of the profession. During the early afternoon there was a visit to the Zoological Gardens, where a demonstration of Australian fauna was given by Dr. Paul Dane; and afternoon tea-parties were given at the invitation of Mrs. Edward Regan, Mrs. Alfred Derham, and Mrs. D. D. Upjohn.

At 4 p.m., in the Melbourne Town Hall, a civic reception took place, when a welcome was given the Association by the Lord Mayor in the presence of about three hundred people, including overseas members of the Association, Section officers, and representatives of public bodies.

Late afternoon parties were held for members by the Victorian Women Graduates' Association at the Lyceum Club, by Dr. and Mrs. J. P. Major, by Mrs. Victor Hurley, and by Mrs. E. F. Herring. In the evening a ladies' dinner was

given by the Victorian Medical Women's Society to over-seas and inter-State medical women, and at the Melbourne Club Sir James Barrett entertained at dinner.

At 9 p.m. a reception was given by the Premier and the Victoria State Government at the National Gallery, where three was a full attendance of some 2,500 guests. Academic dress was worn, and the gay colours of robes and ladies' frocks made a brilliant scene, the Premier and his wife receiving their guests at the entrance to the Circular Gallery. During the official supper, which was held in the Japanese print room, the Premier, Mr. Dunstan, welcomed the Association, and Dr. Watson Smith suitably replied.

At 9 a.m. on Tuesday, September 10th, Sir William Miller delivered the first clinical address, in the Anatomy Lecture Theatre, his subject being: "Dental sepsis and its relation to focal infection," and at 9.30 a demonstration was given in the Pathology Museum. This collection of pathological specimens was in every way admirable, so that regret was expressed that it could not be allowed to remain intact for some time before being closed down.

Mr. D. J. Mahony, director of the National Museum, conducted a party round the City Museum, the National Gallery, and the Public Library; while others visited the Fitzroy Gardens, where could be seen Captain Cook's cottage and the Horticultural Exhibition in the Glass House. A lawn-tennis tournament was arranged to begin on this morning, and several whole-day excursions had been planned. Mrs. B. T. Zwar entertained some forty guests to a morning tea-party (which is a fashionable entertainment in Australia) at her house in connection with the doubles tennis tournament arranged for over-seas and inter-State visitors in courts in Hamilton Road.

At 11 a.m. the adjourned Annual General Meeting of the Association and President's Address took place at the Town Hall. This was the business meeting at which the new President, Sir James Barrett, was installed by the retiring President, Dr. S. Watson Smith. There were about 2,000 present in the Great Hall, and the variously coloured robes and the ladies' frocks added brilliance to a very dignified ceremony. From beginning to end the meeting was attended with colour and ceremony such as is seldom seen in Melbourne.

Outside the hall, before the time of meeting, a guard of honour of the Melbourne University Rifles was posted. At the arrival of the Governor-General and Lady Isaacs, the Governor of Victoria and Lady Huntingfield, the guard came to attention and presented arms, the first few bars of the National Anthem being played. Thereafter the Governor-General inspected the guard; then he climbed the grand staircase to be met by the retiring President and the President-Elect. In the hall itself were graduates and Fellows, arrayed in the academic robes of thirty-one universities and medical colleges, with gowns and hoods of eighty-four different colours and designs, in which scarlet and crimson predominated.

In a stirring address Sir Isaac Isaacs discussed the significance of the meeting and the honour which it conferred upon Australia, and declared the Meeting formally open. The Lord Mayor, on behalf of the City Council and the citizens of Melbourne, extended a welcome to members of the Association. He asked Sir James Barrett to accept a flag "as a small token of the esteem in which we hold your wonderful Association". The flag was gratefully accepted by Sir James Barrett, who said: "It will be sent to London and will be hung in the Great Hall of the Association in common with the flags of other cities in which the Annual Meeting has been held". The remainder of the meeting was devoted to investitures, to the introduction of new officers and honorary members of the Association, and to the delivery of the Presidential Address. Two Australians whose services to the Association have been long and generous were introduced as Vice-Presidents by election: Dr. R. H. Fetherston of Melbourne and Professor W. N. Robertson of the University of Queensland, Brisbane. Sir Edward Mitchell was then introduced as an Australian honorary member—"one who by his wise administration of trust funds has done much to advance the cause of science in general and medical research in particular".

At 1 p.m. the Victorian Officers of Sections invited over-seas officers to luncheon at the Hotel Windsor, when opportunity was afforded office-bearers to become acquainted with each other. At the same time a Masonic luncheon was held at the Freemason's Hall in Collins Street.

At 2.30 were held clinical society demonstrations at St. Vincent's Hospital, an official visit to St. Andrew's Hospital, half-day excursions, and afternoon tea-parties.

At 4.30 the official religious service took place at St. Paul's Cathedral, after robing in the Chapter House. A procession was formed which walked to the great west door of the cathedral and up the central aisle to the front of the church. In addition to many robed members of the profession there were large numbers of the general public to fill the cathedral. The unity of man in body, mind, and spirit was the theme of the sermon preached by the Bishop of Wangaratta. At the same hour a religious service was held at St. Patrick's Cathedral, where there was a repre-

sentative attendance of Roman Catholic members of the British Medical Association. They were provided with reserved seats in the nave. Academic dress was worn. The high altar and sanctuary were decorated with bright flowers and lighted candles. The Rev. Dr. D. Lyons conducted the spiritual exercises, and Archbishop Mannix, who was assisted by the Rev. E. Fennessy and the Rev. Dr. Lyons, gave benediction. Monsignor J. Lonergan and the Rev. W. P. Hackett, S.J., were in the sanctuary also. The benediction hymns were sung by the congregation. The preacher was the Rev. W. P. Hackett, rector of Xavier College, Kew, who said that in honouring physicians and surgeons from all parts of the British Commonwealth of Nations, Melbourne was honouring itself. Those present had attended to pay corporate respect to the Great Healer, for all healing came from God.

In the evening there were three dinner parties: at the Melbourne Club, given by the Victorian Branch of the British Medical Association, by the President of the Victorian Branch, Major-General R. M. Downes, and by the Chairman of the Federal Council, Sir Henry S. Newland. This dinner was a full-dress one given to visiting members. The second was the Returned Medical Officers' Dinner at the Hotel Windsor; and the third the official Ladies' Dinner at Menzies Hotel. All proved highly successful and enjoyable.

At 8.30 p.m. there was a brilliant assemblage at the Town Hall on the occasion of the President's Reception, where Sir James Barrett and Lady Barrett entertained between two and three thousand guests. Several fascinating Australian films were shown: of Central Australia, of the Great Barrier Reef, and of the Seal Rocks and other interesting scenes on Port Philip Bay. The delegates from all parts of the Empire were present, wearing robes and hoods, which produced, with the many colours of the ladies' frocks, the appearance of a magic garden, so marvellous were the scarlets and reds with the subtle intermingling of other tints. The dais was banked with cinerarias and nemesia; and in the official supper room were baskets of boronia and daffodils set on each table. The guest list included all over-seas and inter-State members of the Association and their wives and friends, as well as men and women important in city and political life, the men being accompanied by their wives. There was dancing, which continued till 1 a.m.—altogether a memorable reception, which was representative of every interest in the community.

At 8.45 a.m. on Wednesday, September 11th, clinical addresses were delivered by Sir Ewen Maclean, on "The general practitioner and forceps", in the Public Lecture Theatre, Arts Building; and by Dr. S. Watson Smith, on "Skin manifestations in diagnosis—a Larken lecture", in the Anatomy Lecture Theatre, University of Melbourne.

At 9.30 a.m. there was a tour to Mount Dandenong and a morning tea at the invitation of Mrs. L. Balfour, Mrs. H. C. Colville, Mrs. G. H. Cowling, Mrs. D. C. Pigdon, and Miss Cato. There was also a tour to Warrandyte, Eltham, and Kangaroo grounds; and morning tea by invitation of Mrs. A. L. Kenny and Mrs. C. H. Mollison.

At 10 a.m. certain whole-day excursions left. At this hour the Sectional Scientific Meetings opened in the University buildings. While these were going on the ladies were taken by Mrs. J. A. Gilruth, Mrs. H. F. Maudsley, and Mrs. John Shaw to visit the Shrine of Remembrance and the Botanical Gardens, while morning tea was provided at the Quamby Club at the invitation of Mrs. Julian Smith. At 11 a.m. the second Embley Memorial Lecture was delivered by Dr. Z. Mennell at the University, his subject being "Methods of producing anæsthesia".

At 1 p.m. the Irish Medical Schools' and Graduates' Association Luncheon took place at the Hotel Windsor; and there were held at the same hour the Medico-Legal Society and the Rotary Luncheons.

At 2 p.m. there was a tour to Frankston and the surrounding district, with a visit to a private golf club to see the native fauna and flora. Afternoon tea was provided at the Peninsula County Golf Club, and at this hour, too, certain other half-day excursions left.

At 3 p.m. honorary degrees were conferred by the University of Melbourne upon a number of distinguished visitors from over-seas, these being conferred by Sir James Barrett as Chancellor of the University. At the ceremony the procession formed in the cloisters, entered the Hall at 3 p.m., and became seated. The Chancellor then welcomed the visiting members of the British Medical Association. The following were then severally presented for admission to degrees as a special grace by the chairman of the professorial board, Professor D. B. Copland: Lord Horder, Sir Henry Gauvain, Dr. John S. Fairbairn, Dr. Robert Hutchison, Professor Edwin Bramwell, Sir William H. Willcox, Sir Henry Lindo Ferguson, Sir Ewen Maclean, Dr. E. K. Le Fleming. To the degree of Doctor of Dental Science: Dr. E. Wilfred Fish.

Immediately afterwards, by permission of the University authorities, Dr. Fairbairn, President of the British College of Obstetricians and Gynæcologists, who wore his robes as President of the College, conferred membership of the College upon eighteen new members from various parts of Australia. An eloquent address was thereafter delivered by Dr. Hutchison, and a garden party was held in the University grounds. From 3 to 4.30 a clinical

demonstration of cases was given at the Orthopædic Hospital, Frankston. There were also late afternoon parties.

At the Melbourne Club a private dinner party was given by Dr. A. E. Rowden White, and a dinner party was also given at Government House by the Governor of Victoria and Lady Huntingfield. The reception previously arranged by the Governor and Lady Huntingfield had been cancelled because of Court mourning.

Hospital Service Department Notes

Arrangements in Certain Provinces for Compensation for the Care of Traffic Accidents

The desirability of a more satisfactory adjustment of medical and hospital remuneration for the care of traffic and other accident cases has resulted in special legislation covering such in one province, Quebec, and the development of special non-legislative arrangements in three other provinces, Manitoba, British Columbia and, quite recently, Ontario. The passage of the Charitable Institutions Injured Persons Costs Privileged Payment Act last year set a very worthy precedent for Canada, although the measure as finally passed did not entirely correct the situation. The essential points in the Quebec legislation are that any claim for damages must include the accounts of the hospital and of the doctors in charge, and that no settlement may be effected unless the amounts of these accounts be paid directly to the institution and to the doctors. In case of judgment, these amounts are to be paid directly.

Because of the opposition to legislation protective to the medical profession and the hospitals non-legislative "agreements" have been effected in the three provinces named between the insurance underwriters, the doctors, and the hospitals. In British Columbia the insurance underwriters executive committee in 1932 requested the member companies, when settlement was being arranged, to advise the hospital authorities and the doctors of this fact, thus giving them an opportunity to protect their own interests. This has proved a great help, although the hospitals at their convention in November requested more adequate protection. The so-called "Manitoba System" is also a tripartite agreement. If the claimant be willing, hospital and other fees are settled directly; if the claimant or solicitor insist upon receiving all payments made, the recipient is urged to meet these other obligations and the company may advise the doctor and the hospital. A joint committee considers complaints respecting overcharging, etc., and, after nearly four years of operation, the experience has been reasonably satisfactory, although the protection is still far from complete.

The most recent agreement is that effected in Ontario a few months ago by the Ontario Medical Association, the Ontario Hospital Association, and the Canadian Casualty Underwriters Association. It is agreed that the basis of surgical and medical fees shall be the minimum scale adopted by the Ontario Medical Association and that the hospital shall be allowed the Workmen's Compensation Board rate, $3.00 per diem. The Companies will instruct adjustors and others to endeavour to obtain permission to pay the hospital and the doctors directly; each group will appoint a committee which will cooperate with the others in adjusting matters of difference.

These arrangements are considered at greater length in the Report on Legislation (Bulletin No. 16) of the Canadian Hospital Council, copies of which may be obtained from our Department of Hospital Service.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

Medical Societies

The Royal College of Physicians and Surgeons of Canada

The Fifth Annual Meeting of the College was convened at Ottawa on the afternoon of November 1, 1935, in the Auditorium of the Canadian Research Council. The President, Dr. Duncan Graham, occupied the Chair and fifty-three Fellows were present.

The President presented the Report of Council, drawing particular attention to the following matters.

1. Specialists. The Council of the College, together with other organizations, has been studying the problem of the qualification and certification of those of the medical profession who practise a specialty. A committee of Council is being continued to give further consideration to this important subject.

2. Amendments to the B-laws were presented and confirmed. For the most part they referred to unimportant details, but the following changes are of importance:

Article 3, section 2, subsection C, now reads: "Candidates who are graduates of 1930 or prior thereto of a Medical School or University approved by Council shall not be required to take

the Primary Examination, but shall, in the Final Examination, demonstrate a general and practical knowledge of the clinical application of Anatomy and Physiology. The Examination for this special class of candidate shall consist of:

(*a*) The final examination as presented to the regular candidates.

(*b*) A special examination in Anatomy and Physiology conducted by clinicians.

The privileges of this subsection shall become obsolete on December 1, 1940."

Note—The examination fee for this special group shall be $75.00 for the inclusive examination.

Fees for examination have been lowered, *viz.*, $25.00 for the Primary Examination, and $50.00 for the regular Final Examination. The fee for the Fellowship has been raised to $150.00.

The Code of Ethics was amended by the addition of this paragraph: "That this College lay down the principle that partners or employers in clinics or group practices who are Fellows of this College will hereafter be considered equally responsible for any public advertising or similar indiscretions which may be published or otherwise circulated by such clinics or groups."

3. Results of Examinations, 1935.

At the meeting of Council in June it was decided that an attempt should be made to reduce the cost to the candidates presenting themselves for examination. To that end invigilators were appointed to supervise the written examinations held synchronously in seven centres across Canada. Only those candidates who successfully reached the required standard in the writtens were summoned to attend the Orals which were held in Montreal.

There were twenty-two candidates for the Primary Examination, of whom the following were successful: Jacques Bruneau, E. A. Dobson, A. F. Goggio, Jessie Gray, G. W. Manning, A. M. Ogryzlo, J. V. R. Ord, T. S. Perrett, W. D. Stevenson, and J. W. Wilson.

There were seven candidates for the Final Examination, two in the Division of Medicine and five in the Division of Surgery. All but one of the candidates came under the special regulation remitting the Primary Examination. The successful candidates were: Dr. R. L. Anderson, Edmonton, (Division of Surgery) and Dr. E. V. Shute, London, Ont. (Division of Surgery). Ad eundem Fellowship was granted by Council to: Dr. Arthur W. Hay, F.R.C.S., Edin., of Winnipeg. Dr. Kenneth Alexander Hamilton, M.R.C.P., Lond., of Edmonton. Dr. H. H. Hyland, M.R.C.P. Lond., F.R.C.P. Canada, was presented with his diploma of Fellowship.

4. Deceased Fellows.

Since the last annual meeting it is reported with regret that the following Fellows of the College have passed away:

Drs. Alexander McPhedran, Toronto, December, 1934; William Webster, Winnipeg, October, 1934; R. H. Craig, Montreal, March, 1935; Pierre Z. Rhéaume, Montreal, September, 1935.

5. Elected to Council and Election of Officers.

The Honorary Secretary announced the results of the Election for members of Council and the total personnel of present Council:

PHYSICIANS

Dr. Duncan Graham, *ex officio* as immediate Past-President.

Newly elected: Drs. J. A. Bauer, Hamilton; H. A. Farris, Saint John; J. G. FitzGerald, Toronto; C. R. Gilmour, Winnipeg; A. H. Gordon, Montreal; Geo. S. Young, Toronto.

Former members, retiring in 1937: Drs. W. T. Connell, Kingston; J. R. Corston, Halifax; J. E. Dubé, Montreal; Geo. C. Hale, London; E. L. Pope, Edmonton; M. P. A. Vallée, Quebec.

SURGEONS

Newly elected: Drs. E. B. Alport, Regina; W. E. Gallie, Toronto; J. A. Gunn, Winnipeg; G. A. Ramsay, London; F. A. C. Scrimger, Montreal; G. E. Seldon, Vancouver.

Former members, retiring in 1937: Drs. L. J. Austin, Kingston; A. T. Bazin, Montreal; B. G. Bourgeois, Montreal; P. C. Dagneau, Quebec; J. S. McEachern, Calgary; G. H. Murphy, Halifax.

The incoming Council had elected the following Officers of the College:

President, Dr. A. T. Bazin, Montreal; *Vice-President*, Division of Medicine, Dr. A. H. Gordon, Montreal; *Vice-President*, Division of Surgery, Dr. B. G. Bourgeois, Montreal; *Honorary-Secretary*, Dr. Warren Lyman, 292 Somerset Street, Ottawa; *Honorary-Treasurer*, Dr. R. E. Valin, Ottawa.

The officers were duly installed by the retiring President, Dr. Duncan Graham, and with suitable remarks the meeting was adjourned.

Prior to the Annual Business meeting of the College a Scientific program was presented, which comprised the following contributions:

1. Professeur Pierre Masson, M.D., F.R.S.C., F.R.C.P.C., des Universités de Strasbourg et de Montréal, "Histophysiologie Circulatoire des Extremités (Les glomus neuro-myo-arteriels)".

2. Hector Mortimer, M.D., F.R.C.S.(Edin.), McGill University, "Hormone Factors in Bone Growth".

3. Frederick F. Tisdall, M.D., F.R.C.P.(C.), University of Toronto, "The Relation of Diet to Bone Diseases".

The Annual Dinner of the College was held in the Chateau Laurier. The guest speaker was Prof. C. T. Currelly, Director of the Royal Ontario Museum of Archæology, Toronto.

Canadian Physiological Society

The first meeting of a proposed Canadian Physiological Society was held in Toronto, at the University, on October 19, 1935. At this meeting, as well as presentation of the scientific programs, steps were taken for organization.

Three resolutions were put to the meeting and carried:

1. The Society shall be called the Canadian Physiological Society.
2. The object of the Society is to promote the advancement of physiology and its related branches of science and to promote a friendly spirit among those Canadians who are engaged in these fields.
3. Membership—(*a*) Those persons who have conducted researches and published papers in the fields of physiology, biochemistry, pharmacology, and the experimental aspects of biology, pathology, therapeutics and hygiene. (b) Members shall be elected on a ballot sent to members of the Society by post.

A Provisional Committee, with representatives from the various Canadian Universities, was appointed to take further steps in organization and to arrange for an original membership in the society. The committee consists now of: Prof. V. E. Henderson, Dr. E. W. McHenry, Toronto; Prof. J. Tait, Dr. J. S. L. Browne, McGill; Dr. J. K. W. Ferguson, University of Western Ontario; Dr. G. H. Ettinger, Queen's. This Committee is adding to its membership from each of the other Canadian Universities. They have elected the following office-bearers in the committee: Convener, Prof. J. Tait; Secretary, Dr. G. H. Ettinger; Treasurer, Dr. J. K. W. Ferguson. The Committee is now engaged in drawing up a constitution and preparing an original membership list.

At present only one meeting of the Society per annum is contemplated. The next meeting is to be held in Kingston in the third week of October, 1936.

The Society before adjourning expressed its great indebtedness to Dr. J. S. L. Browne who had carried out the duties of temporary secretary and arranged for the Toronto meeting.

G. H. ETTINGER

At the scientific meeting of this Society held on October 19, 1935, a number of excellent papers were read. A partial program was published in the December issue of the *Journal*. Additional papers, to be noted now, were "Further observations on the caudate nucleus", by Prof. F. R. Miller, Department of Physiology, University of Western Ontario, London, Ont., and "The effect of nucleophosphatase upon nucleohistone", by Gerhard Schmidt, Department of Chemistry, Queen's University, Kingston, Ont. Abstracts of these two papers are given below.

FREDERICK R. MILLER—Further Observations on Stimulation of the Caudate Nucleus.

The caudate nucleus constitutes the first link in the series of basal ganglia, forming with their connections the extrapyramidal system; special interest attaches to this system, owing to its involvement in the syndromes of Wilson's disease, Parkinsonism and paralysis agitans. Despite the probable motor functions of the caudate nucleus the results of faradic stimulation have, hitherto, been either negative or of equivocal value, largely owing to the proximity of the internal capsule. In the present research the nucleus was exposed under barbiturate anæsthesia, care being taken to protect its vascular supply and thus to maintain neuronal excitability; under these conditions the nucleus itself was found to be responsive to unipolar and bipolar faradization, as well as to the local action of strychnine. Among the effects localized by weak faradization in the nucleus are: slight repeated flexions, pro- and supinations of both forepaws; slow, rigid flexion of both forelegs, with claws bared; slow rigid flexion of both hindlegs; sometimes rigid extension of ipsilateral hindleg. One per cent strychnine nitrate applied to the nucleus, or injected into it in minute amount, as a rule duplicates the responses from faradization in a particular experiment. Other reactions to faradization are: dilatation of the pupil; horizontal nystagmus with retraction of the nictitating membrane, stronger contralaterally; licking of the lips and jaw movements; elevation of tail; body drawn caudally or turned laterally, sometimes opisthotonus. Since the caudate nucleus is traversed by a few corticospinal fibres with collateral endings (Cajal) it is possible that some of the contralateral effects of faradization are attributable to these fibres; among such effects are contractions of the opposite semitendinosus muscle. Strychnine, however, cannot conceivably be effective on the corticospinal fibres and, moreover, its responses simulate closely those of faradization; thus, the effects of faradization and strychnine, when similar, must be attributed to excitation of the neurones of the caudate nucleus. The responses of the caudate nucleus are slow in onset, decline gradually and are bilateral in distribution; they thus differ fundamentally from the brisk, contralateral responses evocable by faradization of the internal capsule.

GERHARD SCHMIDT — The Effect of Nucleophosphatase upon Nucleohistone.

The behaviour of thymusnucleohistone against nucleophosphatase is essentially different from that of free thymonucleinate. Free thymonucleinate, either in pure solution or mixed with thymonucleohistone, is dephosphorized nearly quantitatively; the enzymatic hydrolysis of thymonucleinate follows the rule of a monomolecular reaction. From the thymonucleohistone, in the contrast, only a small part (about 15 to 20 per cent) is dephosphorized relatively quickly. The rest of the phosphorus is released extremely slowly and new enzyme must be added repeatedly in order to continue the dephosphorization. Since free nucleinate, also if mixed with nucleohistone, is dephosphorized nearly quantitatively, the different behaviour of both cannot be attributed to an inhibiting effect of the nucleohistone on the enzyme but is caused by a chemical difference between free and protein-linked nucleic acid.

Trypsin-digested nucleohistone is attacked by phosphatase at the same rate as free nucleic acid. Since the nucleic acid component is not altered by trypsin, it is very probable that the linkage between the nucleic acid and the protein component in nucleohistone is an organic one and that the nucleohistone cannot be regarded like a salt between nucleic acid and basic histone.

The Moncton Medical Society

On November 13th, Dr. R. J. Collins and Dr. George Skinner presented a paper before the Moncton Medical Society on "Surgery of the chest in tuberculosis", reporting a series of thoracoplastic operations, fifty of which were performed between 1923 and 1933 and 41 between 1933 and 1935. All this work was done

at the Saint John Tuberculosis Hospital. Dr. Collins discussed the clinical aspects and Dr. Skinner the surgical procedures. Their address was illustrated by slides. The attendance at the meeting was large, and discussion was provided by Drs. Baxter, Perry Knox, Fitzpatrick, Roach and Girvan.

The Ontario Laennec Society

The Ontario Laennec Society held its Thirty-eighth Meeting at the Muskoka Hospital for Consumptives, as guests of Dr. W. B. Kendall, on October 25, 1935. The program was presented by Dr. Kendall and members of the staff of the Sanatorium.

In his opening remarks, Dr. W. B. Kendall discussed the subject "Medicine in the tuberculosis sanatorium". The development of tuberculosis sanatoria in the last thirty years forms a unique chapter in medical history. Certain truths have been established and certain opinions formed which are not widely known outside this institution. In the minds of laymen and even of some of the profession there exist various misconceptions of the nature of the work performed therein. It may be that we have painted for the public too rosy a picture of the curability of the disease. In spite of the brilliant advances in therapy, both medical and surgical, the larger part of work in the sanatorium must still be devoted to those patients for whom life can only be precariously prolonged or suffering assuaged. The care of these patients requires as high a degree of skill and interest as that of those with more optimistic prognoses. The average length of stay in the sanatorium is less than one year. This period is obviously too short to produce satisfactory arrest in the majority of public patients.

Modern surgery has brought into anti-tuberculosis work new hopes, new inspiration and a re-arrangement of ideas. But tuberculosis remains a medical disease. Chest surgery will curtail the time required for treatment in many individual cases, but it is not correct to say that it will reduce the general sanatorium cost. Those cases whose cure is accelerated by surgery will be offset by the many whose lives will be merely temporarily prolonged. Every sufferer from tuberculosis should receive the benefit of sanatorium treatment. Because of the overcrowding of the institutions and of the cost to impoverished municipalities, substitute accommodation has been proposed but will be found to be satisfactory for very few cases.

Re-establishment of the tuberculous patient is essential, but the sanatoria cannot be expected to undertake this with their present equipment and finances. The problem of the sanatorium at present is not what the patient will do after he is discharged, but whether he has an appreciable chance of getting better at all. This is illustrated by the fact that the death rate of a representative sanatorium is in the neighbourhood of 20 per cent. Re-establishment should be conducted preferably in a centralized institution devoted to this work, and receiving patients from all sanatoria.

In a paper entitled "Twenty years of artificial pneumothorax", Dr. H. C. P. Hazelwood summarized the hospital's experience with that form of treatment. Time has widened the scope of artificial pneumothorax and established it as the method of choice in the active treatment of the disease. It is supplemented, not replaced, by other forms of chest surgery. The extent to which pneumothorax treatment is now used is reflected in the fact that 32 per cent of the patients in the hospital are receiving this form of treatment. The continuance of this treatment following discharge is being fostered by the development of centres at which patients may receive refills. These centres are established in order to serve as wide an area as possible.

A paper on "The qualitative classification of pulmonary tuberculosis" was given by Dr. C. B. Ross. It is important that classification should be based on the type of disease as well as its extent. No satisfactory qualitative system has yet been presented. That in use at the Muskoka Hospital is based largely on radiological findings and employs simple terms which have both radiological and pathological connotations.

1. Exudative.—(i) simple exudative; (ii) exudative caseous; (iii) caseous ulcerative; (iv) ulcerative sclerotic.
2. Productive.—(i) granular; (ii) granular nodular; (iii) granular nodose; (iv) granular ulcerative; (v) granular fibrotic.
3. Exudative productive.—(i) primarily exudative; (ii) primarily productive.
4. Cirrhotic.
5. Acute miliary.

This classification recognizes the existence of two distinct types of disease. On the one hand are the cases which show large areas of confluent exudation (exudative) and on the other, those which show many small disseminated areas of disease with limited perifocal exudation (productive). In between is a group of mixed forms (exudative productive). The subgroups can be considered as phases in the evolution of two fairly distinct forms of the disease.

Cavity formation occurs in exudative disease as a result of coagulation necrosis occurring on a relatively massive scale in the centre of an area of intense consolidation. The typical round, thin-walled cavities of productive disease are formed by the microscopic disintegration of alveolar walls and septa producing a

defect which assumes a round shape due to the elastic parenchymal pull.

The sub-group ulcerative sclerotic contains many cases previously labelled "chronic fibroid". They are now recognized as the end results of an acute process and are grouped with the other phases of exudative disease.

There is considerable clinical evidence to support the claim that the cases of productive disease originate hæmatogenously and are frequently seeded in successive implantations.

Dr. M. B. Wellwood's discussion of "Gold therapy" was based on a study of over ninety cases. The results are unpredictable and variable, but, on the whole, the experience of the Muskoka Hospital has been highly satisfactory. Gold exerts a definitely modifying action of the pathological process. Some cases, improved under treatment, have later relapsed, and shown further improvement when administration of gold salts was again commenced. The results in a limited number of cases of asthma and chronic arthritis have also been gratifying.

The experience of the sanatorium with the blood sedimentation test was given by Dr. A. H. Duncan. The test has been done routinely and repeated at short intervals on all patients for the last five years. While the test is not specific, its value as a diagnostic lead is unquestioned. In tuberculosis, it is a definite indication of activity and, to a lesser degree, of the extent of disease. Its chief value is in prognosis. A normal sedimentation rate or one which returns promptly to normal after the inception of such special treatment as artificial pneumothorax is of such favourable import as to render the test indispensable in sanatorium practice. A patient's disease should not be considered quiescent until the sedimentation rate is normal.

In the evening, Dr. B. M. Williscroft gave a paper on intrapleural pneumolysis, based on a study of 69 cases. Various types of adhesions and their method of severance were demonstrated by x-rays and operative drawings. Improvement followed the operation in over 70 per cent of cases. Cauterization of adhesions is not without danger, both immediate and after operation, and requires great patience, care, and ability to define complicated anatomical structures through a very small viewing instrument. The operation should be considered in all cases of artificial pneumothorax in which compression of the diseased area is not adequate.

The guest speaker of the evening was Prof. P. G. Goldsmith, whose paper "The treatment of the common cold" dealt thoroughly with acute infections of the upper respiratory tract, their etiology, diagnosis, treatment and sequelæ.

Dr. I. H. Erb presented a case report of a boy, 6 years of age, who was admitted August 1, 1935, to the Hospital for Sick Children, Toronto, with a differential diagnosis of tuberculous meningitis or cerebellar abscess. The patient had a right mastoidectomy August, 1934, and March, 1935, following the incision of a lump behind the right ear in April, 1934, from which cheesy material was obtained. On admission, the child had restlessness of left arm and leg. The intracutaneous tuberculin test was positive. The spinal fluid showed lymphocytes and increased globulin, but tubercle bacilli were not found. The cerebellum was explored and no lesion found. An opening was made through the frontal bone, and a marked internal hydrocephalus was found and tubercle bacilli were demonstrated in the fluid removed at time of operation. At autopsy, there was a basal tuberculous meningitis, and tuberculoma in the left lobe of the cerebellum and in the pons.

M. H. Brown, Connaught Laboratories, University of Toronto, was elected Secretary-Treasurer of the Society to succeed Dr. Clare Brink who recently retired. M. H. BROWN

Letters, Notes and Queries

The Therapeutic Value of Phenol

To the Editor:

I would like to hear some comments from my colleagues on the use of Phenol and its therapeutic value. During the past few months I have been using a 5 per cent aqueous solution with great success as a "cold cure", and as a means of stopping a head cold from "going into the chest" in patients with pulmonary tuberculosis. I have used it on over fifty cases with only one failure. It is also of benefit to the chronic sinusitis flare-up.

I inject 0.3 c.c. subcutaneously into the upper arm, and press down with a piece of absorbent cotton before removing the needle, so that very little of the solution is left in the skin, and the local reaction is slight. One dose is usually sufficient, but if it is necessary may be repeated for three days. The above dose is for adults; infants and children are relieved of "grippe" by 0.1 c.c. in the same manner. I am using 1 drop of pure phenol on a lump of sugar by mouth three times daily for those patients with upset digestive mechanism. Usually three days will be sufficient to give them relief. For those who have not tried these methods, they are well worth investigating. I know in Europe some of the internists use phenol a great deal, and I believe that it is as a result of the phenol ring in some of our "cold cures", that relief is obtained. Yours very truly,

W. ARNOLD FARRELL, M.D.,
Assistant Resident,
The Laurentian Sanatorium,
Ste. Agathe-des-Monts, Que.

December 16, 1935.

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

The last of the results to be declared in the recent Parliamentary election was that in connection with the three Scottish University seats.

There were four candidates, Prof. Graham Kerr (Unionist), Mr. A. Noel Skelton (Unionist), Dr. G. A. Morrison (Liberal National), and Prof. A. Dewar Gibb (Scottish National). Unfortunately Mr. Skelton died in the interval between the sending out of the papers and the counting of the votes. The voting, carried out under the proportional representation system, resulted in the return of Prof. Graham Kerr, Dr. Morrison and Mr. Skelton. It will accordingly be necessary for the machinery for a writ for a by-election to be put into operation when Parliament meets.

It is now one year since the Edinburgh Public Medical Service was instituted, and the working of the scheme has just been reviewed at the first annual meeting of the members. The service was organized to provide medical attendance and all necessary medicines to the dependents of persons of limited means by the payment of a few pence per week. Free choice of doctor was afforded under the scheme. The first year had necessarily to be an experimental period, but the Executive Committee in their report stated that they were quite satisfied with the result of the year's working and that there could be no doubt that the service was filling a felt want in Edinburgh.

The service at its start required all its members to resign contracts with Friendly Societies where the remuneration was lower than that paid under the National Health Insurance service. The chief difficulty experienced has been in connection with the cost of the medicines prescribed. It had been estimated that the amount required for the drug fund would be approximately 14 per cent of the subscriptions received. During the spring there was an epidemic of influenza and this had the effect of raising the average cost for the year to 18.2 per cent.

The Committee point out that it would be of benefit to the service if the doctors would keep in mind the desirability of adding suitable subscribers to their lists as opportunity afforded. They emphasize that certain benefits would thereby accrue to the doctor. The goodwill of his practice would increase, as he would have a more saleable asset; he is relieved of the trouble of sending out large numbers of small accounts —a certain proportion of which would never be paid; he can rely on receiving his payments quarterly; and he is enabled to supervise the health of his patients without making them think, as they otherwise might, that he was running up a heavy bill.

Of recent times it has been frequently observed that the condition of the teeth of the population of Scotland in general and of the working classes in particular leaves much to be desired. Various factors have been suggested as the cause. Changes in the diet of the people, the greater consumption of carbohydrate food, the lowered consumption of milk, and want of care in keeping the mouth clean doubtless have an important bearing on the question. Indeed it has been suggested that the prevalence of dental caries may arise from the vitiation of the processes of teeth formation in the unborn fetus or in infancy as a sequel of dietetic insufficiency. Much attention is now being given to remedy the existing state of affairs. There is evidence that the system of school medical inspection and the provision of early conservative dental treatment is improving the position so far as the rising generation is concerned. To be really effective, however, a much larger staff of dentists would require to be employed.

Edinburgh is taking a large part in the crusade for better teeth. The dental hospital in the City has been recently enlarged and a newly equipped treatment centre established. The institution is now admirably suited for the dual purpose of affording treatment and for the teaching of students. Under the National Health Insurance Scheme certain societies provide their members with dental treatment as an additional benefit, but the service is incomplete as only those societies which have sufficient funds are able to do this. In the absence of a national scheme, which would be very costly, the question of taking steps to ensure that all insured persons should be entitled to dental treatment as a statutory benefit is being carefully considered.

The Departmental Committee on Scottish Health Services is now nearing the end of its investigations. At a recent meeting representatives of the Voluntary Hospitals gave evidence regarding the future position of these hospitals. Some fear was expressed that the local authorities might attempt to use the powers recently conferred on them in the way of providing new hospitals without having sufficient regard to the existing voluntary hospitals. It was urged that the voluntary hospitals should be officially recognized by the State as an essential factor in the health services and that a thoroughly representative organization should be set up to bring these hospitals into closer relationship with the Department of Health for Scotland.

R. W. CRAIG

7 Drumsheugh Gardens,
Edinburgh.

The London Letter

(From our own correspondent)

The most interesting medical event of the last month has undoubtedly been the announcement that a meeting is shortly to be held to inaugurate a public society to be known as "The Voluntary Euthanasia (Easy Death) Legislation Society" with Lord Moynihan as president. This is the outcome of a presidential address given three years ago by Dr. Killick Millard before the Society of Medical Officers, when the whole subject was presented with a force and clarity that at once focussed attention upon this awkward subject. A draft Bill has been prepared with high legal assistance and is now ready for introduction to the House of Lords. It is claimed that there is backing for the Bill by numerous religious representations and Saint Thomas More is also invoked in its support! From the discussion which has followed this announcement it is clear that the medical profession is somewhat divided in its views. As one practitioner has pointed out, an overwhelming majority might support a project for "easy dying" but be less enthusiastic about being the actual active parties in promoting "easy death". A perusal of the main features of the draft Bill suggests, moreover, that the word "easy" is being used a little lightly and that the procedure to be followed by the sufferer who desires a speedy release is complicated enough to deter any but the most determined dier. Clearly, the present position of the law, whether as regards the doctor who gives an overdose of opiate or the incurable patient who commits suicide, is unsatisfactory, but it is probably as near to an interpretation of the "common weal" as it can be made without opening the road to an even more unsatisfactory state of affairs.

The mention of the legal aspect of euthanasia may serve to introduce a brief comment on certain recent judicial decisions. One of the most important was that an unqualified man may not call himself a "manipulative surgeon" because it suggests that he is in fact a surgeon of a special type. The public are at the moment more sympathetic than they have been for a long time to the cause of the registered as against that of the unregistered practitioner, for the recent House of Lords' inquiry did much to remove misunderstandings from the pundits of the popular press. It should be pointed out, however, that the unsuccessful defendant against whom the above action was decided is not barred from practice. Indeed it is a curious provision of the present Medical Act that there is no restriction on any type of medical or surgical practice by the unqualified—with one important exception which has been emphasized by a recent prosecution. A medical man who had been struck off the medical register by a decision of the General Medical Council has recently been charged because he has continued to treat patients suffering from venereal disease—the one specific complaint with which the quack doctor must have no dealings. It will be interesting to see how the case goes, and it raises an interesting point as to whether other serious diseases ought not to come under a similar ban. A third legal point recently raised seems a very hard one. It has been ruled that the certificate of a deceased practitioner may not be put in evidence. This is a long-standing point of procedure, and while it seems unfortunate on first considerations it is obvious that it might, if allowed, open the door to serious abuses.

While the discussion on maternal mortality goes on one expert has dropped a small bombshell by boldly advocating institutional midwifery for all. He meets the obvious criticism regarding the risks of infection by making his plea qualified by the additional suggestion of one-bed wards. The idea is, of course, not new, but so much of the recent discussion has been concerned with raising the standard of domiciliary midwifery,—better training of doctors and midwives, better antenatal work, etc.—that the new suggestions, coming from an emeritus professor of wide experience, strikes an almost revolutionary note. He suggests that the large type of institution shall have a resident "master" of senior standing, with, under him, a whole-time staff of large experience. In smaller hospitals, serving country areas, a specially trained local practitioner would be in charge, and in both cases the midwives would work closely under medical supervision in the institution. Obviously such a scheme would necessitate the building of a large number of necessarily expensive hospitals (because of the one-bed system) but this objection is well met in the published account of the proposals by the statement that a small lying-in hospital should be an essential part of the lay-out of a modern garden-city or any new residential area. So far the suggestions have not received serious criticism or attention, but to some readers they throw a new light upon the situation.

ALAN MONCRIEFF.

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VOCAL FREMITUS.—D. Sucic points out that difficulties are met with in women, children, men with high-pitched voices, and patients with aphonia when the orthodox method of eliciting vocal fremitus is employed. Since bronchial breathing, increased vocal fremitus, and pectoriloquy are an important diagnostic triad, the author has sought for another method of eliciting vocal fremitus. He found that he could evoke the sign by asking the patient to hawk or cough. In patients with healthy cords hawking, in those with diseased cords, coughing, produces the best results. The reasons are: (1) the pitch of a cough is lower than that of the voice, and these "noises" contain semitones which bring them into harmony with those of the lung; (2) the intensity of these "noises" is greater and produces larger vibrations of the cords. Sucic has found his method of use when the classical one has failed, and deems it an important diagnostic asset.—*Med. Klinik*, 1935, p. 1012.

Topics of Current Interest

Noise and Health

The furor and the clangor of modern life sound a note far different from the tones heard by the people of previous centuries. We think of ancient man as living in an atmosphere of quietude with only the songs of the birds, the hum of the bee, the murmur of the brook and the occasional vocalization of wild animals impinging on his tympanum. Yet no doubt in the middle ages, when men strutted about in mail armour and beat on shields with their swords, the apparatus of hearing must have had some alarming sensations. Nowadays the shrieking of train and steamboat whistles, the rumble of the wheels of street cars, the sirens of police motorcycles, fire apparatus and street car, gas and electric repair trucks, the tooting and fluting of motor horns and the programs emanating from innumerable radio devices tend to produce a concatenation of sounds beyond anything that may have disturbed people fifty years ago.

In Great Britain they are taking their noise situation quite seriously. In June an exhibit was held by the Anti-Noise League, at which Mr. H. G. Wells presided and at which Lord Horder spoke on the relation of noise to health.[1] Mr. H. G. Wells began by pointing out that there was a great deal to be said for noise. Indeed, if he had to choose between a silent world and the world as it is today, he would reluctantly choose the latter. He ventured the interesting observation that he could not work in absolute silence, preferring an undercurrent of noise. If he could not hear a distant piano or the subdued sounds from the street he was understimulated. Several American writers have pointed out that they like to listen to the radio while writing or working, apparently being able to focus their attention fully on the task in hand while subconsciously listening to the sounds coming from the radio horn. Perhaps satirically, Mr. Wells said that the noises of towns were not to be compared with the dreadful noises which pursued one in the country. No one who had not heard it could imagine how exasperating the nightingale could be when heard all night long, followed at dawn by the twitterings of birds. "What humanity needs," said Mr. Wells, "is not to banish noise but to control it." Yet he felt that people ought to be able to achieve an auditory isolation exactly as they are able to detach themselves visually from others and that some method of soundproofing our lives is required.

From the scientific point of view, Lord Horder pointed out that, of course, every one recognizes the relationship of noise to the loss of sleep or to the disturbance of sleep. Nature has arranged to protect us against many of the incidents of life. If light is too sudden or glaring, the rapid action of the eyelid saves the delicate curtain of the retina from harm. A crash in our vicinity causes us to shrink back from danger. There does not appear, however, to be any good reflex mechanism for the protection of the human ear, at least not thus far developed in the evolution of the human being. Perhaps nature never realized that human beings would produce machines as vast and powerful as those we now have. Sudden noise is certainly a disturbance affecting nerve integrity. Some individuals are much more susceptible to noise than are others. Civilized man is more sensitive to noise than uncivilized man, and the child is less sensitive to it than the adult. Various noises affect different people in different ways. A man who may not object to a two-hour session with the radio will find the whining of a child or the whimpering of a puppy acutely annoying. Motor horns are a necessity, but certainly there is no need for such horns as one sometimes sees advertised with the claim that the sound can be heard three miles away. Neither is there a necessity for the raucous, shrieking, ear-splitting devices with which some motorists equip themselves.

The abatement of noise is another example of the social control necessary in a changing civilization. As man is becoming more and more closely crowded, as the machine is introduced into human life, as every one of the special senses of mankind is subjected to new stresses and strains, organized civilization must pay attention to these new factors for the benefit of mankind as a whole. Mr. H. G. Wells expressed a doubt as to whether life was more exacting now than in bygone times. He said the trouble was that people tried to get much more out of life than they had ever attempted before. Men of 60 or 70 nowadays are trying to play the part which men of 30 or 40 played in the past. Yet Mr. Wells failed to take into account that modern medicine has made it possible for more human beings to live to the age of 60 or 70 and to live useful lives to advanced years. Of this, Mr. Wells is himself an example. The civilized world of a century or two centuries ago was dominated by young men because there were few old persons available to carry on the work of the world. Today the majority of people live to the age of 60 and the experienced brain has advantage over that of youth. Yet continued gains can be made only by protecting the brains and the senses of man against such hazards as are easily preventable and of little significance for human advancement. Of these, noise is certainly one with which we may most easily dispense.—*J. Am. M. Ass.*, 1935, **105:** 886.

1. Noise Abatement, *Brit. M. J.*, 1935, **2:** 19.

Epidemic Diseases in Ethiopia

Death and disease are No. 1 enemies along the lengthening Italian-Ethiopian battle lines. Reports on disease conditions in Addis Ababa as communicated in consular reports to the U. S. Public Health Service read like the index to a medical book.

Epidemics of typhus fever, relapsing fever and smallpox are harassing the Ethiopian capital and surrounding country, according to the latest report. The number of cases or even of deaths in these three epidemics is unknown, as no statistics on sickness, deaths or births are collected. Vaccination against smallpox is not practised.

Leprosy is very common in Ethiopia. So are venereal diseases, and syphilis is reported to be more prevalent there than in any other country. It is said that 90 per cent of the adult population is affected by some venereal disease. Malaria, of course, is always present. Tuberculosis, grippe, pneumonia, quinsy, asthma and dysentery are other diseases reported prevalent. Practically all the adults in the country have tape-worms.

Cholera and plague are not mentioned in the consular reports, and Ethiopia is out of the yellow fever and sleeping sickness regions. But as one health official put it, if these four diseases are not present in the country, they are about the only ones the Ethiopians do not have.—*Science News Letter*, 1935, **28:** 228.

Medical Patents

Within the same week the University of Pennsylvania and Mr. Irenee du Pont amicably decide to part because he wishes his Biochemical Foundation to patent its medical discoveries and use the profits for research, and Columbia University gratefully accepts the patent of Dr. Leroy L. Hartman for a "desensitizer" which makes it possible to drill and fill teeth painlessly. Medicine is evidently torn by a nice question in ethics. The idealists hold that science is debased when it becomes a source even of impersonal profit; the realists argue that so long as the laboratory worker in medicine does not himself benefit financially by his discovery and sees to it that the proceeds of his patents are applied in conducting more research, both society and science must be the gainers.

At present at least twelve American universities and foundations patent medical and biochemical discoveries and apply the profits to maintain rigorous standards of quality or to finance more research. Not one can be fairly accused of commercialism. To say that science debases itself when it seeks to earn not a personal profit but a research income is sheer nonsense. Even in the great industrial laboratories, which are conducted primarily for profit, there is no indication that science stands on a lower plane than in the universities. Indeed, the granting of the Nobel Prize to men like von Haber, Bosch, Bergius and Langmuir, all corporation hirelings, speaks for itself. No one ever accused the late Professor Michael I. Pupin of having forgotten his scientific ideals because he patented his telephone load coils. We have still to hear of a professor of chemistry becoming less of a scientist because he takes fees for solving some factory problem.

The fear that jealousy would be aroused if medical discoveries were patented and that experimentation must be cloaked in secrecy is unfounded. There are no royalty jealousies in the great industrial laboratories. A patent is regarded merely as the momentary conclusion of a piece of research and stands on precisely the same basis as a scientific report. A good director sees to that. If the experience of biological and medical laboratories is otherwise, bad management must be the reason.

Insulin, the scarlet fever preparation of the Doctors Dick, Doisy's hormone extract known as theelin, and a dozen aids to suffering humanity have been patented primarily to control purity, something apparently impossible with free competition. This motive is latterly accompanied by a desire to finance research. There is also a growing dissatisfaction with the exploitation of unpatented discoveries by firms that contribute nothing to the progress of science. So, to cite but one example, we behold insulin patented to control its purity and to sell it at a profit of 10 per cent with the result that the Banting Foundation has been able to aid ninety-two research projects in Canadian universities and to finance the work done at the University of Toronto on silicosis and vitamins. If this is wicked the universities should be consistent and reject all endowments for medical research. For endowments come from profits—sometimes profits from the sale of patented drugs and medical apparatus. And the authors of books on medicine and surgery should spurn royalties, since there is no difference in principle between copyrights and patents.

What with mounting estate, inheritance and income taxes, the day of open-handed philanthropy is over. Either the State must come to the aid of research, which it can do only by piling on more taxes, or science must help itself without sacrificing its perfect objectivity and humanitarianism. Patenting medical and biological discoveries, not for personal gain, but for the sake of science, seems an honourable and democratic solution of the difficult problem thus presented.—*New York Times.*

A SIGN IN SCARLET FEVER.—E. Medak describes a sign which he has found useful in differential diagnosis of scarlet fever. It consists in the appearance, on the second day, and sometimes before the general rash, of a crop of minute vesicles, containing watery fluid, at the outer border of the concha of the ear, on the helix, and at the border of the finger- and toe-nails. The vesicles are best seen when lighted obliquely, and are absent in the other exanthemata.—*Wien. klin. Woch.*, December 7, 1934, p. 1484. Abs. in *Brit. M. J.*

Medico-Legal

XVII.

Hebert v. Deslandes*

Quebec—Considerations to be taken into account in estimating fees to which a physician is entitled.

The plaintiff, a physician, sues the defendant, in his quality as sole heir and universal legatee of the late Dame Philomène Deslandes, for the sum of $329.00 as the value of professional services rendered the deceased. The plaintiff, in consequence of the requirements of the Quebec Medical Act,† alleged that he was a duly registered member of the College of Physicians and Surgeons of the Province of Quebec and had as such paid all the necessary fees. The defendant in part pleaded that the plaintiff's charges were exorbitant in view of the services rendered by him. He however tendered the sum of $175.00.

The court held that in appreciating the justice of a physician's charges it must take into consideration the position and fame of the physician, the importance and duration of the treatment, the position, financial and otherwise, of the patient, the seriousness of the illness and its duration, the previous relationship between the physician and the patient, the number and duration of the visits, and whether they were made during the day or at night. The court may, however, when there have been numerous visits, reduce the amount usually charged for a single visit.

The physician in this case was at the time the services were rendered thirty years old and had been practising about four years. The patient lived at a moderate distance from the physician's office. In the course of forty-two days, thirty-nine visits were made during the daytime and nineteen at night. At many of these visits injections had to be given and the results awaited.

The court held that the defendant's tender of $175.00 was insufficient and condemned him to pay the sum of $250.00, with interest from the date of service and costs. (G.V.V.N.)

XVIII.

Wood v. McMartin‡

Quebec—Method of determining a physician's fees.

The plaintiff, a physician from Chicago, sued the defendant for $182.00, as the balance due for professional services. The defendant contested the action on the ground that the charge was excessive, but confessed judgment for $100.00 and tendered that amount into court.

It is of course possible for a physician to enter into an agreement in advance with his patient as to the amount of his fees, and such a contract will be binding on both parties just as any other contract. But here, as is nearly always the case, no agreement had been made. Nor in Quebec does there exist a tariff covering the amount of a physician's fees, as there is for some of the professions.

In the absence of an express agreement and in the absence of a tariff, the court held that it must take into consideration not only the standing of the physician but also the position, earning power and the responsibilities of the patient in evaluating the services. The patient in this case was earning $90.00 a month, and on that was supporting himself, his wife and his three children. In these circumstances the court held that the physician was entitled to $149.00, and the defendant's tender was in consequence insufficient. Judgment therefore was rendered for that amount with interest and costs.

(G.V.V.N.)

* (1933) 39 R. de J. 293, Mr. Justice Surveyer.

† R.S.Q. cap. 213, section 59—1.

‡ (1918) 54 S.C. 391, Mr. Justice Guérin. This case was referred to in *Matheson v. Smiley*, (1932) 2 D.L.R. 787, digested in the *Journal* for December, 1935, p. 694, and was also referred to in *Hebert v. Deslandes*, digested above.

Abstracts from Current Literature

Medicine

Acute Hæmolytic Anæmia of Lederer. Joules, H. and Masterman, L. M., *Brit. M. J.*, 1935, **2**: 150,

The authors report four cases of this interesting type of anæmia, first definitely correlated as an entity by Lederer in 1925. They consider that it is one of the most important of the smaller classes of recently recognized anæmias in view of its amenability to treatment and the possible confusion with pernicious anæmia and infective endocarditis. If such confusion exist, valuable time may be lost in applying the specific remedy—blood transfusion.

It is pointed out that the etiology is quite unknown. The striking clinical feature is the acute febrile onset of severe hæmolysis, with a resultant anæmia characterized by a striking reduction in the number of red cells, down to 1,000,000 or less, and a colour-index often slightly above unity. Reticulocytes are found, up to 15 per cent; anisocytosis and poikilocytosis are quite marked. There is always definite icterus, and a positive indirect van den Bergh test. The urine may contain bile and sometimes hæmoglobin. Leucocytosis may be quite marked. The invariable pyrexia, present in all reported cases, falls rapidly after transfusion. This treatment was successful in the four cases reported, but has sometimes failed. The authors consider that

liver therapy, tried for some time in three of the cases, had no demonstrable effect. The test meal findings showed only slight achlorhydria.

It is possible that this anæmia is more frequent than is generally recognized; the importance of full investigation of all anæmias before commencing treatment cannot be overstressed. The most important diagnostic criterion of acute hæmolytic anæmia is the dramatic and permanent effect of blood transfusion.

W. FORD CONNELL

On the Use of Chest Leads in Clinical Electrocardiography. Roth, I. R., *Am. Heart J.*, 1935, **10**: 798.

The introduction of lead IV by Wolferth and Wood, in 1932, lead to a widespread utilization of chest leads as a routine in electrocardiography and gave a new impetus to the study of the electrocardiogram. Endeavouring to give chest leads their just place as a diagnostic procedure, the author stresses strongly the original statement of Wolferth and Wood that lead IV does not in any way replace the routine electrocardiogram, but should be used as an adjunct to it. It is pointed out that where lead IV shows definite abnormal findings the original three leads will in the majority of cases give the necessary diagnostic information. The observation is made that a considerable number of electrocardiograms showing abnormal standard leads are not accompanied by abnormalities in lead IV, and, further, that an abnormal lead IV with a normal standard electrocardiogram is extremely rare. It is suggested that a chest lead for routine electrocardiography embody the following features: (*a*) that its tracing record maximal deflections, and that it include well-defined auricular as well as ventricular complexes; (*b*) that its tracing be symmetrical with the standard leads, and (*c*) that the chest lead requires but a single chest electrode.

The right arm chest lead fulfils these requirements and is also more convenient for bedside use, as it only requires one chest electrode. Objections are raised to the numerical designation of chest leads. The designation lead IV implies a relation to the standard leads, whereas no such relationship exists, and also lead IV has not been a fixed lead. It is suggested, therefore, that chest leads be designated by well-known anatomical landmarks, indicating the location of the chest electrode, the right arm attachment serving as the fixed secondary electrode. Thus right pectoral (^{R}p), left pectoral (^{L}p) and apical (^{A}p) leads are suggested as routine leads in clinical electrocardiography.

W. H. HATFIELD

Clinical Observations upon Syncope and Sudden Death in Relation to Aortic Stenosis. Marvin, H. M., *Am. Heart J.*, 1935, **10**: 705.

Sudden and unexpected death in heart disease is considered the exception rather than the rule, there being but few cardiac conditions which terminate with dramatic suddenness sufficiently often to make one aware of such a probability. It is pointed out that several of these are well recognized — coronary artery disease, anginal heart failure, A-V heart block, and syphilitic aortitis with aortic insufficiency. In these four distinct manifestations of cardiac disease the prognosis is properly regarded as ominous, but it is apparently not widely recognized that the same hazard exists in those patients having stenosis of the aortic orifice. A group of 11 patients who presented typical signs of aortic stenosis is reported. Seven of these were of the rheumatic type and 4 of the arteriosclerotic or calcareous type. Nine died with extreme suddenness when they appeared to be in their usual health, and 4 did not have heart failure at the time. Autopsy in three cases failed to reveal any adequate cause for the sudden death. Five of the eleven patients were subject to sudden and unexpected loss of consciousness, and in all of these syncope occurred chiefly or only in association with exertion. The possible causes of sudden death and of syncope and their possible relation to aortic stenosis are discussed. It is indicated that present evidence does not justify final conclusions, but it is suggested that sudden death may be due to hyperactivity of the carotid sinus reflex, associated with aortic stenosis, or to the same mechanism that terminates life in patients with anginal heart failure or recent myocardial infarction.

W. H. HATFIELD

Surgery

Clinical Aspects of Struma Lymphatosa (Hashimoto). Clute H. H., *et al., Arch. Surg.*, 1935, **31**: 419.

The authors report a series of 9 patients, all of them women, with this affection, from the Lahey Clinic and the Department of Pathology, New England Deaconess Hospital. This is a rare type of abnormality, first described by Hashimoto in 1912 and considered to be a type of chronic thyroiditis, usually Riedel's struma, which it closely resembles in many respects. There is a degenerative change in the thyroid gland with no evidence of acute inflammation. Microscopically, there is a diffuse lymphoid infiltration between the follicles, with the formation of secondary nodules, which often reach a large size and occupy the central third of a focus of lymphoid infiltration. Variations in this picture may occur. There may be enlargement of the regional lymph nodes. Fibrosis is rarely a prominent feature, in contrast to Riedel's struma, and is always limited to the capsule of the gland. The fibrosis is dependent on the degree of lymphocytic infiltration that has taken place. Hence, struma lymphomatosa

may be regarded, pathologically, as a lymphocytic infiltration of the thyroid of unknown etiology, inducing an atrophy of the glandular substance and accompanied by a varying degree of interstitial fibrosis. Rarely can a diagnosis of the true condition be made before operation. The average age in the authors' series was 55.5 years. Of the 9 patients, 7 complained chiefly of a goitre, and 6, pressure on the trachea. Some evidence of myxœdema was present at the time of entrance in 3 patients. Clinically, the patient presents a diffusely and symmetrically enlarged thyroid gland, from two to six times the normal size. Both lobes and the isthmus are usually involved. A notable sign on palpation is the marked firmness or stony hardness of the gland. Malignancy may be suggested by reason of this hardness, but the normal contour of the thyroid and the absence of adherence to surrounding structures should rule this out. The basal metabolic rate is usually below normal. Roentgenograms often reveal a narrowing of the trachea, due to pressure of the enlarged lobes or of the isthmus. At operation the gland is found to be much enlarged and non-adherent. It is firm and grayish-pink before removal. On section, it is white and almost œdematous in certain areas. Serous fluid may be expressed. At the Lahey Clinic the operative procedure is to treat these patients as one does patients with chronic thyroiditis of the Riedel type. The pretracheal tissue is excised widely, to relieve pressure on the trachea. Large remnants are left on each side owing to the possibility that myxœdema may be a result. Subtotal thyroidectomy is probably the operation of choice. In 7 of the authors' 9 patients myxœdema developed. The patients should be forewarned that it may occur. Malignant degeneration was not observed among any of the patients.

G. E. LEARMONTH

Fractures of the Neck of the Femur. Groves, E. W. H., *Brit. M. J.*, 1935, **2**: 491.

Causes of non-union in fractures of the femoral neck are mobility, want of apposition, difficulty in controlling or fixing the proximal fragment, the poor blood supply of the head, and the interposition of the capsule. Successful treatment requires accurate apposition, firm fixation, and the removal of intervening avascular tissue. Ideal treatment aims at early restoration of function. Fixation should be achieved as early as possible and be of such a type as to allow early movement and weight-bearing. It should avoid prolonged immobilization in bed.

If these principles are admitted then the Smith-Petersen principle should be regarded as of routine application. Smith-Petersen's nail is of value, since its radiating blades prevent rotation of the fragments after reduction; it allows complete penetration with a minimum of drilling, and the impaction resulting from hammering the nail ensures the closest possible apposition. At operation the site of fracture is exposed. Anything intervening can be thoroughly removed. Practically perfect reduction can be obtained if reduction by this method is carried out, and within one month early movement and weight-bearing may be permitted. Walking may be permitted within one week of reduction. Smith-Petersen's operation is applicable in cases under three months, if there is no marked absorption of the neck or necrosis of the head, and if the patient is not too feeble. Whitman's plaster should be used in the case of patients refusing operation. This method has only achieved from 50 to 60 per cent of successes. The author prefers the Smith-Petersen operation to the method of Johannsen, since the fracture is visualized in the former. After-treatment consists in the use of a short plaster spica or a walking caliper. The latter would seem the better.

If a fractured femoral neck has not united at the end of three months union will not occur without direct attack. One of four things may be done. A walking caliper may be used, operation for uniting the fracture, subtrochanteric osteotomy, or a reconstruction of the hip. There is no satisfactory walking splint. Whitman's reconstruction is probably the best treatment for ununited fractures of the femoral neck.

STUART GORDON

Obstetrics and Gynæcology

The Toxæmia of Pregnancy. Goodall, J. R., *Am. J. Obst. & Gyn.*, 1935, **30**: 577.

All toxæmic cases can be placed in two great categories, the acute and the chronic. Acute cases have been greatly reduced by antenatal clinics. Chronic cases outnumber the acute cases by about fifty to one. The acute case is quickly over, leaving usually a minimal unrecognizable loss of function after recovery and a reserve capacity that seems to be unimpaired. Chronic cases, by virtue of their duration and low intensity, permit a certain corporeal adjustment, but function under these new circumstances means cell stress and that, if prolonged, spells permanent exhaustion and lack of power of recuperation.

Acute cases fall readily into four clinical cases: renal, hepatic, extravasatory and neural. Their relative incidence is 20 renal types to 2 hepatic to 10 extravasatory to 1 neural. The prognosis is inversely as their incidence.

The question of the effect of toxæmia on the after-life of the child demands careful and prolonged attention.

Underlying placental disease is the common fundamental cause, toxæmia, and a predisposing factor, senility. In order of their frequency the placental diseases are chorionic sclerosis,

placentosis, hæmorrhages, degeneration cysts. Placentosis shows red hepatization if the process is acute, or gray hepatization, if chronic. Placental hæmorrhage is one of the commonest of placental diseases. It is another of the many placental manifestations of a general toxæmia. Degeneration cysts have no clinical significance except as an index of degeneration.

ROSS MITCHELL

The Upper Urinary Tract in Pregnancy and Puerperium, with special reference to Pyelitis of Pregnancy. Baird, D., *J. of Obst. & Gyn. of Brit. Emp.*, 1935, **42**: 577, 733.

These articles are based on six years of clinical research on the urinary tract during pregnancy and the puerperium. Prior to this the only available method of study in the human being has been post-mortem examinations, but with the newer urological methods careful study has been made of the dilatation in the ureters and renal pelvis which occurs during pregnancy.

For means of comparison, the effect of gynæcological tumours, such as inflammatory masses, large ovarian cysts, and fibroids, on the urinary tract in the non-pregnant woman was studied. Tumours of sufficient size and soft consistency can compress the ureter and cause dilatation and interference with its function. A left-sided cyst causes dilatation of the left ureter, whereas a cyst which fills the abdomen uniformly, exerts pressure equally on both sides, but the dilatation is greater on the right. Generally however, dilatation of the ureter caused by a pregnancy of the same size as the cyst is greater.

There are two causal factors of the changes which occur in the urinary tract in pregnancy—first, atony of the ureter, and second, compression by the pregnant uterus. Stasis begins early in pregnancy, reaches its maximum at the sixth month, diminishes near full term, only to recur again in the puerperium. It is thought that the variations in the œstrin content of the blood during pregnancy influence the tone of the urinary tract just as they do the uterus. Dilatation is said to occur in over 80 per cent of pregnant women and is more marked in primiparas. When the ureter lies along the psoas muscle it is compressed by the pregnant uterus for the greater part of its course. If however it is displaced laterally, as often occurs in the second half of pregnancy, the ureter escapes compression until it crosses the psoas muscle at the level of the pelvic brim.

Infections of the urinary tract are very common during pregnancy. In this investigation, 7 per cent of healthy pregnant women in whom the urine was sterile at the beginning of pregnancy developed infection of the upper urinary tract, most commonly due to the *S. albus*. That urinary infection is an important complication of pregnancy is shown by the fact that in 47.6 per cent of the 101 cases studied it was the most important cause of the patients' ill health.

ELEANOR PERCIVAL

When is Surgery Indicated in Retrodisplacement of the Uterus? Gardner, G. H., *Am. J. Obst. & Gyn.*, 1935, **30**: 596.

An analysis was made of 145 cases operated on in the past five years for retroversion. In only 6 per cent was the retrodisplacement the only abnormal finding at operation, but in many cases the associated genital lesions were of little importance. The most frequent symptoms were lower abdominal discomfort, uterine bleeding, dysmenorrhœa, sterility, and backache. Retroversion was responsible for backache in only one-fourth of the patients, and in none of the cases reported was it the cause of sterility or of the tendency to abort. The author believes that retrodisplacement predisposes to large, cystic ovaries which function abnormally, and to endometriosis.

The operation recommended has given 100 per cent satisfaction, that is, no uterus has returned to its backward position even after pregnancy. In the first place the uterosacral ligaments are sutured together for a distance of 1½ to 2½ inches below their cervical insertion, and, as well the posterior leaves of the broad ligaments, are sutured to each other and to the uterus with silk. Then a Baldy-Webster suspension is done with silk, and finally the bladder reflection is advanced to a nearly normal location on the fundus.

ELEANOR PERCIVAL

Pædiatrics

Ketogenic Diet in Persistent Pyuria. Summerfeldt, P., Johnston, M. M. and Kaake, M. J., *Arch. Dis. in Childh.*, 1935, **10**: 389.

The ketogenic diet as a treatment for persistent pyuria was introduced by Clark and Helmholtz in 1931. These observers found that when the acidity of the urine was increased below pH 5.4 the urine became bacteria-free in a short time and the pus disappeared. Later (1932), Clark showed that this result was not due to the acidity of the urine. Fuller, in 1933, found that the principal factor inhibiting the growth of bacteria in the urine was a ketone body—alpha-beta-hydroxy-butyric acid, but that this substance was inactive when the reaction of the urine was more alkaline than pH 5.6.

The present authors have studied the effect of a ketogenic diet (that outlined by the Mayo Clinic) on a number of children suffering from pyuria. Three of these little patients had bilateral hydronephrosis, 1 a prolonged pyuria in the absence of any anomaly, and 10 had unilateral hydronephrosis. All those with an anomaly had an obstruction either at the ureterovesical orifice or at the pelvo-ureteral junction

due to an aberrant artery. One child had a renal calculus on the left side as well.

The patients were started on a $\frac{\text{fatty acid}}{\text{glucose}}$ ratio $\frac{1.6}{1}$, and over the period of a week the ratio was increased to $\frac{3.0}{1}$. In a few cases the ratio was increased to $\frac{3.3}{1}$. Later, the patients were given ammonium chloride, 10 grains three times a day, with a view to hasten the formation of an acid urine. Surgical measures were employed to correct the obstruction in seven children, all of whom subsequently manifested bacilluria. Four of the 7 were placed on the ketogenic diet. Two did not become bacteria-free; 1 did, and 1 became bacteria-free but relapsed. In the case of 10 children who received no antecedent surgical treatment the urine became sterile in 9 after the ketogenic diet. The authors conclude that by means of the ketogenic diet the urine can be made bacteria-free and pus-free in 65 per cent of cases.

JOHN NICHOLLS

A Cured Case of Congenital Fragility of the Bones. Dreyfus, J. R., *Arch. d. Méd. des Enfants*, 1935, **38**: 614.

Dreyfus reports the case of a boy, born on March 28, 1934, who on the day of his birth suffered from a fracture of his left arm. The mother (who had a goitre) brought the child to the clinic one month later. Two other children in the family presented signs of rickets, and the father had been rachitic in childhood. However, there was no family history of fragility of the bones, deafness, or of blueness of the sclerotics.

Palpation of the cranium was attended with the crackling sensation of a layer of papyrus. The anterior fontanelle was 3 cm. in diameter. There was bossing of the ribs which might have been indicative of slight rachitism. There was crepitus on moving the left humerus, and the left tibia presented a condition suggesting a callus. The skin of the scrotum was red and slightly infiltrated. The sclerotics were blue. There was no deafness nor laxity of the ligaments of the joints. The Wassermann test was negative. The blood picture showed nothing remarkable. Blood calcium measured 9.4 mg. per cent (normal, 10 mg. per cent); phosphorus, 3.02 mg. per cent (normal, 5 mg. per cent).

Fracture of the right humerus occurred on April 29th, that is, three days after admission; fracture of the left femur, on May 3rd; and fracture of the right femur on May 9th. Radiography revealed fractures of both humeri, femora, and clavicles, of several ribs, and of the left tibia and fibula.

The child was placed on "Redoxon" Roche (0.05 g. ascorbic acid = vitamin C), once or twice a day, from May 9th to 19th, lactate of strontium, and, later, "Ergorone Specia" (vitamin D). On June 21st "ergorone", 6 drops, was given three times daily, with lactate of strontium, 1 g. three times a day, and calcium lactate, 0.59 g., three times a day, plus fruit juices. By July no more fractures had occurred, and when seen in May, 1935, the child was apparently cured.

JOHN NICHOLLS

Ophthalmology

The Etiological Significance of the Elementary Body in Trachoma. Thygeson, P., Proctor, F. I. and Richards, P. A., *Am. J. Ophth.*, 1935, **18**: 811.

Epithelial scrapings from the trachomatous eyes of Indian children were found to contain Prowazek-Halberstaedter bodies. A preparation made from them was filtered through a collodion membrane. Part of the filtrate was cultured, part centrifuged, and part instilled into the conjunctival sac of a normal human eye. The culture media yielded no growth; the sediment after centrifugalization contained elementary bodies; and the eye of the human volunteer after five days incubation developed an acute inflammation which after six weeks was diagnosed as trachoma, the cornea showing the characteristic changes. Elementary bodies were recovered from the conjunctival smears. This experiment confirms the virus nature of the etiological nature of trachoma, inasmuch as elementary bodies were demonstrated in the infective material, in the centrifuged filtrate, and in large numbers in the experimentally-produced disease. No other formed elements of possible etiological significance were demonstrated.

S. HANFORD MCKEE

Uveitis with Associated Alopecia, Poliosis, Vitiligo and Deafness. Davies, W. S., *Arch. Ophth.*, 1935, **14**: 239.

This report concerns a case of bilateral uveitis with associated alopecia, poliosis, and deafness. The clinical findings and various theories of etiology are reviewed, and the similarity of this disease to sympathetic ophthalmia, both in ocular findings and complications, is mentioned. The treatment given was that for the usual case of uveitis.

S. HANFORD MCKEE

Effect of Extract from Cataractous Human Lenses on Senile Cataract. Selinger, E., *Arch. Ophth.*, 1935, **14**: 244.

The literature shows many conflicting reports as to the value of lens protein therapy in the medical treatment of senile cataract. Many factors influence the progress of lens opacities, and the rate of development of senile cataract varies in different patients, and even in the two eyes of the same patient. The use of extracts

from non-cataractous beef lenses should favour instead of retard the development of lens opacities. Extracts from cataractous human lenses seem to have no effect on the progress of senile cataract.

S. HANFORD MCKEE

Urology

Sub-urethral Abscesses and Diverticula in the Female Urethra. Furniss, H. D., *J. of Urol.*, 1935, **33**: 498.

Suburethral abscesses and diverticula are often overlooked, and are therefore apt to be considered rather rare. An anatomical study reveals the length of the adult female urethra to be 2.5 to 4 cm. This presents numerous glands or lacunæ on its floor, also several longitudinal folds, the middle and most prominent being the crista urethræ, which determines the fact that most abscesses and diverticula are to one or other side of it. The urethra is least distensible at the urethral meatus and in some women, especially after the menopause, the calibre at this point is quite small.

The glands may be involved in specific gonorrhœal or non-gonorrhœal infections, and give rise to abscess formation, which assumes considerable size before draining and subsequently results in the formation of diverticula of the urethra.

The symptoms vary in accordance with the condition present, but acute abscess will give rise to pain referred to the vagina or urethra, burning urination, or urinary obstruction, partial or complete. With diverticula, urinary dribbling may be noted. In such conditions there will be found a marked bulging of the urethra into the vagina, and fluctuation will be detected over this mass. The author advises urethroscopic examination in every case with the above symptoms. Urethrograms are of decided value.

The treatment may be accomplished by evacuating these abscesses into the urethra by vaginal pressure or the passage of sounds. Many require vaginal incision and packing. Urinary fistula may occur which require later plastic repair. With diverticula, the smaller ones may be treated conservatively by irrigations, dilatation of the urethra to prevent urinary back pressure, and endo-urethral electro-coagulation. The larger ones will require operation. Cases are cited.

V. J. BERRY

Congenital Valves of the Posterior Urethra. Counseller, V. S. and Menville, J. G., *J. of Urol.*, 1935, **34**: 268.

The history of this condition dates back to Langenbeck, who described the first specimen at necropsy in 1802. Theories as to their etiology vary, some authors believing them to be a hypertrophy of normal structures of the urethra, and others postulating that they originate from the persistence or remains of the urogenital diaphragm. Anomalous development of the Wolffian and Müllerian ducts, or fusion of the colliculus with the roof of the posterior urethra have also been considered as etiological factors. Three types are most commonly met with. The membranous sheets which spread out from the verumontanum anteriorly and are attached to the circumference of the urethra account for about 50 per cent. The second type are essentially the same but occur posteriorly to the verumontanum. The third type is the "iris valve".

There are at present 84 cases in the literature, and of this group 75 per cent developed symptoms before the age of 10 years, 52 per cent of which appeared at or before the age of 5 years. The cystoscopic picture is identical with prostatic obstruction, except for the vesical neck. Infection begins behind the obstruction, and later involves the upper urinary tracts, and the vicious circle is complete. Advanced cases have been demonstrated at birth. The symptoms may be classified as early and late. The early ones are produced by local obstruction and infection; the late symptoms are manifestations of impaired renal function which is secondary to urinary obstruction. The diagnosis is obvious, with careful cysto-urethroscopic examination. Transurethral resection of these valves is a very satisfactory method of treatment.

V. J. BERRY

Neurology and Psychiatry

Cervico-dorsal Sympathectomy in Multiple Sclerosis. Wetherell, F. S., *Arch. Neurol. & Psychiat.*, 1935, **34**: 99.

It is generally recognized that cervico-dorsal sympathectomy will cause arterial dilatation in the brain and probably also in the spinal cord. Wetherell assumes that in a case of multiple sclerosis if the blood supply of the brain is increased by sympathectomy regeneration of the demyelinated areas will follow and possibly reduction in the glial proliferation. He explains the clinical fluctuations in the disease on the basis of some irritating factor, which, acting on the sympathetic nervous system, brings about periods of cerebral vasoconstriction. Eight cases treated by this operation are reported. The status of every sign and symptom was noted before and after operation by several observers. With the exception of the first case, bilateral sympathectomy was done in one stage—consisting in the removal of the inferior cervical and the first thoracic ganglia by the posterior ap-

proach. All the patients stood the procedure exceptionally well. In each instance there was almost immediate amelioration of some of the physical disabilities. One of the cases was operated upon the year previous to this report, the remaining seven within five months. The improvement noticed at first in each instance had continued up to the time of the report. The cases were all at least moderately advanced before operation, and the author feels that more favourable results could be expected from operation at an earlier stage.

FRANK TURNBULL

Abdominal Pain as a Symptom of Disease of the Brain. Wechsler, I. S., *J. Am. M. Ass.*, 1935, **105**: 647.

The relative frequency of abdominal pain as an element in the varied syndromes of brain disease is seldom emphasized. The author of this unusually able article was able to collect 16 cases in a comparatively short space of time. Whether the symptom be found frequently or not, it is beyond dispute that it does occur and is generally overlooked or misinterpreted. In any case it demands explanation. At the present time it is quite impossible to attach any localizing significance to this symptom. It can be definitely stated however, that the visceral autonomic functions, both afferent and efferent, are represented in the brain. Penfield and Gage produced pain in the right lower quadrant by stimulation of the cortical area 7a. F. W. Watts and Fulton produced intussusception by ablation of the premotor area. Hypothalamic stimulation has resulted in peptic ulcer. The frequency of abdominal symptoms in lesions of the posterior fossa would seem to implicate the vagus centres.

Obscure abdominal discomfort is, of course, common in hysteria. Such symptoms are often disregarded; not infrequently operative procedures are embarked upon. It does not seem too far-fetched to suggest that disturbed cerebral function caused by environmental and emotional stimuli may be the underlying basis. Psychogenesis and neurogenesis would thus merge into an indissoluble unity.

In summary then—abdominal pain is a not infrequent accompaniment of brain disease. As yet no localizing value can be attached to this symptom. The bulk of the evidence points to the frontal cortex (premotor area) but the hypothalamus and the vagal centres may also play a part. Possibly some descending path from the cortex through the hypothalamus and bulb may form a connecting link. Both the observation and the proffered explanation may have clinical significance for internist and abdominal surgeon as well as for the neurologist.

G. PATERSON-SMYTH

Therapeutics

The Histidine Treatment of Peptic Ulcer of the Lesser Curvature. Smith, David, *Brit. M. J.*, 1935, **2**: 154.

The author points out that histidine treatment of peptic ulcer had its origin in the theory that such ulcers were due to the lack of certain amino acids of which histidine is most important. The treatment has been reported on favourably by a number of workers, and the author adds his own results in 12 cases which are reported in some detail. The patients chosen ranged in age from 24 to 62; nine were men, three women. The duration of symptoms was from seven months to twenty years. All the cases presented fairly typical signs and symptoms and were radiologically proved. The patients were all treated without confinement to bed, and were allowed ordinary diet without restriction. They were given daily injections of 5 c.c. larostidin (*i.e.*, 4 per cent histidine, a brand supplied by Hoffmann-Laroche Ltd.). In every case, there was rapid loss of various symptoms of gastric "discomfort", vomiting ceased when it had been present, and the general nutrition improved strikingly. Definite fluctulence was the most obstinate subjective symptom. In two cases where it persisted throughout the course of injections it was relieved by the daily administration of 0.4 grains of larostidin by mouth. Tenderness on palpation was invariable before treatment, but the most refractory case yielded after the twentieth injection, while in several the tenderness was gone after only several injections. In a fair percentage of the cases the ulcer could no longer be seen radiologically after the course of treatments.

In conclusion, the author does not acclaim histidine as a certain cure of peptic ulcer, even of the simple lesser curvature type, but he feels that the results reported, together with those of others, definitely prove it to be of value in hastening the healing of such ulcers, and justify further trial and study, as to the nature of its action.

W. FORD CONNELL

The Use of Dilaudid in Gynæcological Surgery. Brown, T. K. and Kleine, H. L., *Am. J. Obst. & Gyn.*, 1935, **30**: 89.

This is apparently the first paper to appear in American literature on this phase of the subject, although M. A. Ruch (*Am. J. Obst. & Gyn.*, 1934, **27**: 717) has written on the use of dilaudid in obstetrics.

"Dilaudid" is, chemically, dihydromorphinone hydrochloride and has been used considerably in Europe, either alone or in combination with other analgesics, for the relief of pain. The drug is given hypodermically or by rectal suppository.

In this paper the authors report their experience with dilaudid in 225 gynæcological cases, chiefly of a surgical character. In 100 cases dilaudid together with hyoscine was used before operation; in 160, dilaudid alone after operation; and in 65, dilaudid in suppository form after operation. In the first group two injections of 1/130th of a grain of hyoscine were given, combined with varying amounts of dilaudid; in the second group dilaudid alone was given hypodermically in the dose of 1/48th to 1/32nd of a grain, the dose being adjusted according to the indications; in the third group the dose of dilaudid, in a rectal suppository, was 1/24th of a grain.

The authors found that complete analgesia and amnesia were obtained in 83 per cent of the cases, moderately good results in 15 per cent, and poor results in 3 per cent. The action was more prompt with dilaudid than with morphine, the patient becoming drowsy five to eight minutes after the first injection. The amounts of the inhalation anæsthetic required were definitely less and the patients reacted sooner after the operation. Dilaudid relieved pain as well as, if not a little better than, morphine, and in much smaller doses. The action of dilaudid was more prompt and the mental faculties did not remain dulled for so long afterwards. Dilaudid did not depress the patient so much as morphine. Only in large doses did dilaudid depress the circulation. The patient was clearer, more cooperative in her nursing care, and was better able to feed herself. When dilaudid was used in place of morphine there was definitely less inhibition of intestinal peristalsis and less distension of the abdomen. Fewer cathartics were required and there were no cases of ileus in the entire series. Vomiting was less common. The amount of catherization required after operations was slightly less under dilaudid. After operation, the exhibition of dilaudid by rectal suppository was an easy and efficient method of administering the drug. Pain was relieved within fifteen and twenty minutes, and for a considerably longer time than when the dilaudid was given hypodermically. JOHN NICHOLLS

Pathology and Experimental Medicine

The Production of a Collateral Circulation to the Heart. Beck, C. S. and Tichy, V. L., *Am. Heart J.*, 1935, **10**: 849.

The frequency of sudden death from coronary disease has led many to give this subject concentrated attention. Many patients, we know, do not succumb to their first attack, but those who survive usually have recurrent attacks, one of which leads to a fatal conclusion. This excellent piece of experimental work was done with the thought in mind of the possibility of producing a collateral circulation where normal vascular supply had become impaired.

Under normal conditions the heart has three sources from which it can receive a supply of blood; the coronary arteries, the thebesian veins, and the extracardiac anastomoses between the coronary system and the blood vessels in the fat and other tissues at the base of the heart. Blood vessels had been noted in pericardial adhesions, and with this thought as a basis the authors have endeavoured to produce a new vascular bed to the heart. The report is based on a study of 103 dogs, upon which 165 operations were performed. The technique is fully reported with concise illustrative protocols. The available bed for vascularization of the myocardium consists of the pericardium, the pericardial fat, mediastinal tissues, pleura, diaphragm, substernal muscles, the musculature of the thoracic wall and the omentum. In these experiments the pericardium, the pericardial fat and the mediastinal tissues were utilized.

It was found that normal dogs could usually tolerate a reduction in size of about one-third of both coronary arteries at one stage. The experiments showed that vascularization of the myocardium from a collateral bed was slight and in some experiments almost completely absent if the coronary circulation was normal. In other words the blood vessels grow into the myocardium when the latter has need for more blood. After establishing a collateral bed collateral circulation was demonstrated as early as three weeks. Direct continuity between the vascular bed and the heart was established by the production of adhesions through sand paper or emery paper, and, finally, special burrs were used for this purpose. It was demonstrated that the total coronary blood flow is important, but distribution of coronary blood flow is also an important factor. There must be an equal distribution of blood to different parts of the myocardium. In those cases where a collerateral vascular bed was prepared it was found possible to almost totally occlude both coronary arteries with complete recovery. In conclusion, the authors state that they have sufficient experimental data to justify the application of this work to human patients, and that this holds promise of overcoming in an effective way the dreadful mortality from diseases of the coronary arteries.

W. H. HATFIELD

Obituaries

Dr. T. Herbert Bell, of Winnipeg, died in the Winnipeg General Hospital on November 28th. Dr. Bell was born in Selwin, Ont., in 1872 and graduated in medicine from Trinity College, Cambridge, in 1897. He did post-graduate work in the London (England) Royal Eye Hospital and later he practised for a few years in Ontario and Saskatchewan. He then specialized in ophthalmology in London, Ont., for some two years and in 1907 came to Winnipeg to pursue his specialty. During the Great War he went overseas with the 4th Canadian Field Ambulance under Colonel Webster, and served throughout the war with that unit, winning the Military Cross. He returned to Winnipeg in 1919 and resumed practice. At the time of his death he was Professor of Ophthalmology in the Faculty of Medicine, University of Manitoba, head of the Eye Department in the Winnipeg General Hospital and a Fellow of the American College of Surgeons. He is survived by his widow.

A service was held at All Saints' Church on November 30th, after which the remains were sent east for burial at Peterborough.

Dr. Bell's death will be mourned by a host of friends and patients, who admired him for his rugged independence, candid speech and skilled hand. He was a highly trained oculist who made no inconsiderable contribution to the development of ophthalmology in western Canada.

Dr. J. Edouard Besner, who practised his profession in Maniwaki, Que., since 1918, died there on November 3, 1935, after an illness of six months.

Dr. Besner, who was in his 51st year, was a native of St. Clet, Soulanges County, Quebec, the son of Michel Besner. He was educated at Valleyfield and Joliette College, later entering Montreal University, from which he graduated in medicine in 1910. From that year until 1918 he resided in Bouchette, removing from there to Maniwaki.

In 1910, he married Miss Leontine Mylord, of Winnipeg. She died in 1931, and two years later he married Miss Ella Rochon, Reg.N., a graduate of Ottawa General Hospital. She survives, together with his father, Michel Besner, and two sons by his first marriage, Arthur and Valorie Besner, of Maniwaki.

Dr. John Donald Cunningham, of Collingwood, Ont., died on November 17, 1935. He was born in 1872 and a graduate of University of Toronto (1909).

Dr. Robert Stewart Dowd, of Quyon, Que., died at the Ottawa Civic Hospital on November 1, 1935. He had been suffering from a gastric ulcer for some time and later contracted pneumonia.

Dr. Dowd, who was in his 68th year, was born in Aylmer East, the son of the late Joseph Dowd, of Eardley, Que., and Jane Stewart Dowd. He was educated in the public schools of Eardley, at Kent Street school and Lisgar Collegiate, Ottawa, and at Trinity College, Toronto.

Graduating from Trinity with the degrees of M.D., C.M. (1895), he did post-graduate work at Edinburgh, Glasgow and London, England, beginning the practice of medicine in Quyon forty-one years ago.

Dr. Dowd was a member of the Ottawa Medico-Chirurgical Society and a charter member of the Ottawa Hunt and Golf Club.

Survivors include his widow, formerly Miss Catharine McLean; three brothers, David A. Dowd, of Eardley; S. H. Dowd, of Ottawa, and J. H. Dowd, Airdrie, Sask.; three sisters, Mrs. E. J. Thompson, Wyman, Que.; Mrs. Lucy Grimes, Aylmer, and Miss Maria J. Dowd, Eardley, Que.; also a number of nephews.

Dr. Griffith Evans. We regret to have to record the death of Dr. Griffith Evans, a centenarian and the oldest graduate of McGill University, who passed away at his home in Bangor, Wales, on December 8, 1935. Dr. Evans celebrated the hundredth anniversary of his birth last August, and at the time was confined to his bed as the result of an accident. He seems not to have overcome this. The Corporation of McGill University sent him a suitable message on his anniversary and the *Journal* noticed the event in the issue of October, 1935, in which details of his life were given.

Dr. Rupert William Glidden died on December 7, 1935, after having been critically ill for about six weeks.

Born in Rodney, Dr. Gliddon spent his boyhood and youth in the Union district, south of St. Thomas. He graduated from the Toronto Medical School in 1913. He practised in Toronto and Sudbury before coming to St. Thomas nineteen years ago.

Surviving are his widow; three sons and a daughter: Clarence, John, William and Margaret, all at home; two brothers, Dr. E. C. Gliddon, St. Thomas, and Russell Gliddon, Toronto; a sister, Miss Mildred Gliddon, B.A., Toronto, and his father, John Gliddon, Union.

Dr. Eli Franklin Irwin, of Weston, Ont., died on November 3, 1935, at his late residence, in his 69th year. He was a graduate of the University of Toronto (M.B., 1890) and of Victoria (M.D., 1890).

Dr. Irwin was born in Schomberg in 1866, and educated at Newmarket High School and the University of Toronto. He began his medical career in Weston and continued there throughout his life. His wife, who was Miss Lulu Bogart, of Schomberg, died some years ago. Surviving is one son, Herbert L. of Weston; three daughters, Mrs. Bruce Metcalfe, of Thistletown, Mrs. Maurice Creswicke, of Toronto, and Mrs. Stanley Smith, of St. Annes-on-Sea, England. A sister, Mrs. W. M. Doxsee, of Toronto, also survives, and two brothers, Dr. J. Walter Irwin of Corry, Pa., and H. E. Irwin, K.C., of Toronto.

Dr. John Edler Knipfel, died suddenly at Wells, B.C., on September 30, 1935. He was born near Kitchener, Ont., in 1876, receiving his early education at Elora and Kitchener, later entering Toronto University, where he graduated in medicine in 1905. The greater part of his professional career was spent in the Province of Saskatchewan where he conducted successful practices at Davidson, Warman and Cabri. In 1926 he came to British Columbia, moving to Wells in the spring of 1935. He is survived by his widow, two sons and two daughters.

Dr. George Francis May, of London, England, died suddenly on October 16, 1935. He was the third son of the late George Matthews May, of Stanford Dingley, Berkshire.

Doctor May was a former medical student of St. Mary's Hospital, London, at which institution he completed two years of study. Coming to Canada, he entered McGill University and graduated in 1895. After qualifying L.S.A. in London he acted for a few months as assistant to Dr. Jerome, a cousin, we believe, of the well-known novelist and humorist, Jerome K. Jerome. Then he was appointed to the staff of the Durham County Mental Hospital, where he remained, with the exception of the interlude of the Great War, for the rest of his life, eventually becoming Superintendent.

Doctor May served with great acceptance during the Great War as a medical officer, chiefly in the neighbourhood of Greece, where he contracted, unfortunately, an

obscure urinary infection which troubled him a great deal subsequently, and, no doubt, contributed to the shortening of his life.

Doctor May was a man of sterling probity, dependable, a pleasant companion, and, during his studentship, made many friends in Montreal who regret his passing. He is survived by his widow and a young son and daughter.

Dr. Walter Fullerton Mayburry, a widely-known Ottawa physician and native of Park Hill, Ont., died on November 20, 1935, at the age of 64. He had been ill four years. Dr. Mayburry was born on May 3, 1872, at Park Hill, Ont., a son of Thomas Alexander Mayburry, of Ireland, and his wife, Agnes Fullerton, of Scotland, who later established residence in Canada.

He graduated from the University of Toronto, and he served as an intern at the Toronto General Hospital, and later at the old Ottawa Protestant Hospital. Until his death he remained on the honorary consulting staff of the Civic Hospital. He was also a director of the Perley Home.

Surviving are his widow, the former Mildred R. Graham; his son, Thomas Graham Mayburry, and Mrs. Mayburry, his daughter-in-law; two grandchildren, Phyllis and Lynne Mayburry.

Dr. Israel Fletcher Longley, Saint John, died on November 21, 1935, at the age of 50 years. He was born at Granville, N.S., was educated at Halifax Academy, Dalhousie University, and graduated in medicine from Queen's University in 1910. Dr. Longley served in the Great War. He had practised at Govan, Sask., Regina, and, since 1924, in the city of Saint John.

Dr. John Alexander Neff, a graduate of Trinity College, Toronto (1888), died at his home in Victoria, B.C., on September 10th at the age of 76. Greatly esteemed for his kindly, genial and optimistic temperament and highly conscientious in all his professional relationships, his unexpectedly sudden death will be regretted by a large circle of friends wherever he has resided.

After having practised for fourteen years in Ingersoll, Ont., where for some time he had held the position of Medical Officer of Health, he came to Edmonton in 1914 and continued in practice until 1929, when, because of failing health, he retired to Victoria, where he had since resided.

Dr. Neff leaves to mourn his loss, his widow, his daughters, Mrs. Depew and Mrs. Hill, all of Victoria, and a son, Dr. Aubrey Neff, Chief Medical Officer of Nicoria, Cyprus, who for many years occupied a similar position in the Fiji Islands and is regarded as a high authority on tropical diseases.

Dr. E. J. Ryan. It is with marked regret that we record the death on November 26, 1935, of Dr. E. J. Ryan, of Saint John. Dr. Ryan had been seriously ill for but a short time and had been a patient in the Lancaster Military Hospital for only a few days.

He was the son of the late Michael and Alice Gallagher Ryan, and was born on February 20, 1883. He was educated in the public schools of Saint John, St. Joseph's University, University of New Brunswick, McGill University, and graduated in medicine from the College of Physicians and Surgeons, Baltimore. He had been a member of the teaching staff of Bellevue Medical College (University of New York), and had held surgical appointments in Bellevue and St. Vincent's Hospitals, New York City.

Dr. Ryan enlisted at the beginning of the late war, served in France and Gallipoli, and after the evacuation of the peninsula transferred to the famous desert cavalry. At the close of the war he practised for some time in Saint John, later did extensive post-graduate work at the University of Pennsylvania. Dr. Ryan had been commissioner of the Saint John General Hospital, and had specialized in urology. His memory, however, will forever be kept green by the work he did for the New Brunswick Medical Society as secretary. The present organization of the Society is built on the foundation of his personal efforts. Various features in the public health regulations can also be traced to his active interest in the practice of medicine.

News Items

Great Britain

Voluntary Euthanasia.—Attention is now being drawn once again to the question of the legalization of voluntary euthanasia—that is, painless death for persons desiring it who are suffering from an incurable, fatal, and painful disease. An increasing number of people in this country believe that it ought to be possible for persons so suffering, if they so desire, to anticipate death by painless means without having to set the law at defiance. Some of these sufferers do end their lives, but, as the law stands, they are guilty of suicide (a felony), while anyone—doctor, nurse, or friend—who aids and abets them is liable to a charge of manslaughter, if not of murder. The verdict of "Suicide while of unsound mind", usually brought in by coroners' courts in these cases, carries with it a stigma.

In order to promote the legalization of painless death for incurables, and to educate public opinion concerning it, a society has now been formed—the Voluntary Euthanasia Legalization Society—and is receiving support from many quarters. Lord Moynihan has accepted the office of president, a number of distinguished men and women have consented to be vice-presidents, and a strong Consultative Medical Council, whose names appear below, has been constituted. With their assistance and under expert legal advice, a Parliamentary Bill has been drafted which sets out in detail the proposed procedure.

An Executive Committee has been formed under the chairmanship of Mr. C. J. Bond, F.R.C.S., consulting surgeon to the Leicester Royal Infirmary, and the honorary secretary is Dr. C. Killick Millard, late M.O.H. for Leicester. It will be one of the principal functions of the society to disseminate information and to provide speakers. A fund is being raised to meet necessary expenses and to carry on propaganda.

The procedure laid down in the Bill to be promoted by the society in order to enable a sufferer to anticipate death is briefly as follows:

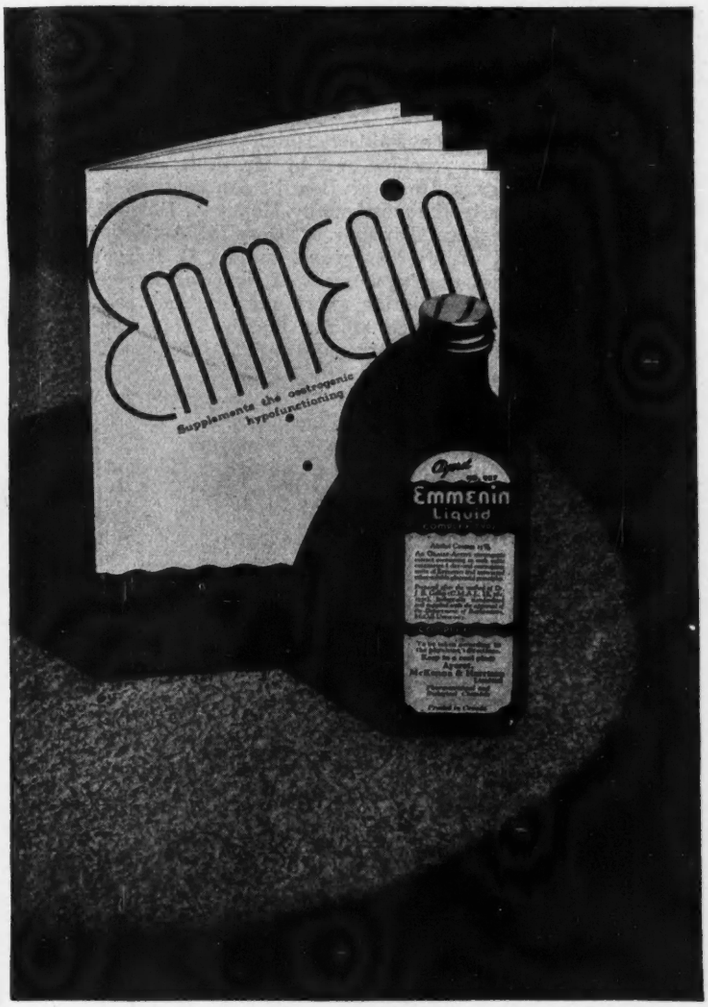
1. The person desiring to receive euthanasia (that is, the patient) must be not less than 21 years of age and must be suffering from a disease involving severe pain and of an incurable and fatal character.

2. The person must make an application in writing (on a special form) and must sign the application in the presence of two witnesses, one of whom must be an official witness—that is, a justice of the peace, barrister, solicitor, medical practitioner, or minister of religion.

3. Before making the application the patient must have consulted his nearest relative, and, to the best of his ability, set his affairs in order. "Nearest relative" is defined as "the husband or wife if living with the patient, or, if there is no husband or wife so living, such other relative, if any, as is living with and has the actual charge of the patient."

4. The application must be sent to a euthanasia referee (to be appointed by the Minister of Health under the Act) accompanied by medical certificates

EMMENIN—*the orally-active, oestrogenic hormone of the placenta, prepared and biologically standardized in accordance with the technique of Dr. J. B. Collip, Dept. of Biochemistry, McGill University.*



"It should be emphasized that Emmenin therapy is essentially safe. In a group of ten cases, Emmenin was administered daily (except during the periods) for several months without disturbing the normal menstrual cycles. . . . The administration of Emmenin does not prevent impregnation nor interfere with gestation."
—*Annals of Internal Medicine, Vol. 71, No. 3, Sept., 1933.*

IN THE TREATMENT OF DYSMENORRHOEA

Emmenin . . a valuable form of supplemental hormone therapy

". . . Our results from the administration of Emmenin have convinced us that it is a valuable form of supplemental hormone therapy, when the pains have a definite origin from forcible uterine contractions . . ." C.M.A.J., 1935, 32:609

Important findings from the use of Emmenin in the treatment of dysmenorrhoea appeared in the C. M. A. J., June, 1935. A full report of this work, carried out under the Department of Gynaecology, University of Toronto, is now available in reprint form. Copies on request.

Emmenin is offered in original, specially-sealed bottles of four fluid ounces.

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(on special forms). One of these certificates must be signed by the medical practitioner in attendance on the patient, and the other by a medical practitioner having certain qualifications or status to be prescribed by the Minister of Health.

5. The euthanasia referee, on receiving the application and before granting permission for euthanasia, must satisfy himself by a personal interview with the patient and otherwise that the requisite conditions have been fulfilled and that the patient fully understands the nature and purpose of the application.

6. Permission to receive euthanasia shall not operate until the expiration of seven days from the date on which the euthanasia referee sends the permit to the patient, and the referee shall, on sending the permit, notify the nearest relative, if any, that permission has been granted.

7. Within three days after receipt of such notice the nearest relative may appeal to a court of summary jurisdiction on the grounds that one or more of the requisite conditions have not been fulfilled, and the court, if satisfied that the allegations are well founded, may cancel the permit.

8. After receiving notice of the appeal the clerk of the court shall forthwith give notice thereof to the patient and to the practitioner by whom euthanasia is to be administered, and the operation of the permit shall then be suspended pending the decision of the court. Appeals are to be heard *in camera.*

9. Euthanasia shall not be administered by any person other than the medical practitioner named in the permit, and shall be administered in the presence of an official witness (of the status mentioned in para. 2 above).

10. For the purpose of the Coroners Act, 1889, a person receiving euthanasia, as provided for above, shall not be deemed to have died a violent or unnatural death; hence, no inquest will be necessary.

11. The Bill provides that the administration of the Act shall be in the hands of the Minister of Health, who is to have power to make regulations: (*a*) for the issue to medical practitioners of licences to administer euthanasia; (*b*) prescribing the duties of euthanasia referees and the fees payable to them; (*c*) prescribing the procedure to be followed in administering euthanasia; (*d*) prescribing the various forms to be used.

12. A special form of certificate of cause of death will be required for the purpose of the Births and Deaths Registration Act, 1894, and this is left to be drawn up by the Registrar-General with the concurrence of the Minister of Health. This certificate is to be signed both by the medical practitioner administering euthanasia and by the official witness.

The president of the Voluntary Euthanasia Legalization Society, as stated above, is Lord Moynihan of Leeds, Past-President of the Royal College of Surgeons of England, and the medical vice-presidents are Sir Humphry Rolleston, Past-President of the Royal College of Physicians of London, and Sir W. Arbuthnot Lane.

The Consultative Medical Council is constituted as follows:

Sir George Buchanan, M.D., F.R.C.P.; Sir Leonard Hill, M.B., F.R.S.; Sir Walter Langdon-Brown, M.D., F.R.C.P.; Sir Frederick Menzies, M.D., F.R.C.P.; Sir James Purves-Stewart, M.D., F.R.C.P.; Sir John Robertson, LL.D., M.D.; Sir Pendrill Varrier-Jones, M.R.C.P.; E. D. Adrian, M.D., F.R.C.P., F.R.S.; T. W. Naylor Barlow, M.R.C.S.; Harold Chapple, F.R.C.S.; R. Veitch Clark, M.B.; W. McAdam Eccles, M.S., F.R.C.S.; James Fenton, M.D.; C. E. Goddard, M.D.; Professor Major Greenwood, D.Sc., F.R.C.P., F.R.S.; H. H. Greenwood, F.R.C.S.; N. Bishop Harman, LL.D., F.R.C.S.; T. N. Kelynack, M.D., M.R.C.P.; J. M. Mackintosh, M.D.; Professor R. M. F. Picken, M.B.; Francis Talbot, M.R.C.S., L.D.S.; Professor W. H. Maxwell Telling, M.D., F.R.C.P.; Professor H. Beckwith Whitehouse, M.S., F.R.C.S.

Dr. Killick Millard, who is the active spirit behind this movement, published in November, 1931, in *Public Health* an article "Euthanasia—a Plea for the Legalization of Voluntary Euthanasia under Certain Conditions," being his presidential address to the Society of Medical Officers of Health. This has been reprinted in pamphlet form by the C. W. Daniel Co., 46, Bernard Street, W.C.1 (2s.).

Alberta

The annual meeting of the Alberta Hospitals Association was held at the Palliser Hotel, Calgary. The various sessions were presided over by Mr. J. H. Adams, K.C., of the Calgary Hospital Board. An address of welcome was given to the members by Mayor A. Davison, Dr. M. T. MacEachern, Director of Hospital Activities of the American College of Surgeons, and Dr. G. Harvey Agnew, Secretary of the Department of Hospital Service, Canadian Medical Association, were present, and each gave much valuable advice at the Round Table Conferences and entered into the discussions of various papers which were read.

Instructive as well as constructive addresses were given by Dr. A. E. Archer, of Lamont, and Dr. J. K. Mulloy, of Cardston, on the "Control of surgery". Dr. Archer remarked that the task of providing adequate surgical care in a province where 50 per cent of the patients are treated in hospitals of less than 100 beds is a difficult one. The larger hospitals were able to handle their own problems without much outside help, but the smaller institutions stood in need of aid. The lack of proper equipment for diagnosis constituted a grave obstacle. The fact that a patient frequently expected his own doctor, working alone, to be equal to any surgical task, induced the practitioner, sometimes, to undertake work for which he was not fitted. He was not always justified by the results obtained. Hospitals working through their own staffs might do much to curb such men by insisting on regulations which would control preoperative, operative and post-operative care, correct diagnosis, and with an irreducible minimum of equipment.

Dr. J. K. Mulloy suggested that an advisory surgeon might be named, together with an intern, whose duties would be to visit the rural hospitals of the province once a month, with the object of advising and assisting the local surgeon. The smaller hospital should be better equipped. It should have a staff of trained nurses and the surgeon or surgeons attached to it should recognize their own limitations. The occasional advice and assistance of a senior surgeon or specialist, would, he felt, be welcomed by the average country practitioner. Such a man would act as a brake on the overly enthusiastic young surgeon.

Dr. M. T. MacEachern was of the opinion that it took from eight to ten years to make a surgeon and the only way that his qualifications could be tested is in the operating theatre. Universities can train him and give him degrees, but knowledge and skill are two separate things. If the country lacks competent surgeons the onus is on the universities and larger hospitals. The young graduates should be given an opportunity to complete their training in our major hospitals. There they can work under the direction of master surgeons and gain the experience they need. You can only learn surgery at the operating table.

Dr. M. T. MacEachern contributed one address on "The organization and management of an efficient nursing service" and a public address on "Cancer, its course and curability".

Dr. D. S. Macnab gave a demonstration at the Calgary General Hospital on "A Cæsarean section", demonstrating operating room technique used in the care of mother and child.

A trip to the Central Alberta Sanatorium was made, where the members had luncheon, at which Dr. A. H.

When Signs Point to Gall-Bladder Dysfunction

GASTRO-INTESTINAL distress... transient abdominal pain . . . or other vague clinical symptoms may indicate gall-bladder disease. In the diagnosis of cholecystic disorder, and as a prelude to every cholecystectomy, cholecystography is a necessary procedure.

The cholecystogram may be the deciding factor in the diagnosis and treatment of the case. It will reveal conclusive evidence if there is a non-functioning gall-bladder. Any stones in the gall-bladder and its ducts, or malformations that interfere with drainage, will be disclosed.

Refer your patients with suspected gall-bladder disease or dysfunction to a radiologist. Cholecystography will fortify your diagnosis and preclude possible error by giving an accurate functional picture of the whole area.

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Baker the Superintendent presided, after which the guests inspected the various buildings of this institution.

On November 12, 1935, Dr. Heber Jamieson, of the University of Alberta, gave a most interesting address to the members of the Calgary Medical Society on "The history of medicine in Alberta". G. E. LEARMONTH

British Columbia

In a series of most interesting articles on Public Health by Professor H. W. Hill, Department of Bacteriology, University of British Columbia, published monthly in the *Bulletin of the B.C. Board of Health*, some interesting observations are made (Vol. 5, No. 14) on disease rates in Vancouver public school children. Prof. Hill states that, according to common belief, malnutrition, among other factors consequent upon five years of unemployment and poverty, might have been expected to increase the incidence of disease, and especially tuberculosis. But the medical records of the Vancouver School Board show no difference in the distribution of acute infections, including tuberculosis, between malnourished and well-nourished children. In addition the rates of the incidence of these diseases in school-children generally have decreased instead of rising.

The eighteenth annual convention of the British Columbia Hospitals' Association was held in Victoria on November 14 and 15, 1935. Tribute was paid to his splendid executive ability in the re-election by unanimous vote to the office of president of Mr. E. W. Neel, of Duncan, B.C. Dr. Malcolm T. MacEachern, Director of the American College of Surgeons, and Dr. Harvey Agnew, Secretary of the Canadian Hospitals' Council, led discussions at a round-table conference at the opening session. Other features of interest were discussions over the questions of hospital sweepstakes, compulsory insurance for public liability of motorists, municipal hospital charges, and the never-failing topic of health insurance.

A resolution to ask the Dominion Government to amend the Criminal Code to permit sweepstakes to aid hospital finances was not supported, on the grounds that it would show lack of confidence in the government's support of hospitals, might delay the establishment of state health insurance, and it was basically an unsound method,

The heavy financial losses to hospitals resulting from motor accidents was the basis for a resolution in which the convention sought power from the government to have insurance companies pay hospital bills and deduct the amount from the insured's policy. The motion was also adopted to ask the Provincial Government to enact compulsory public liability insurance on motorists.

Another resolution was adopted in which the Convention reiterated its stand of the previous year, in which the Government was asked that if state health insurance was not established at the next session of the Legislature the Government should compel payment of $1.25 per diem charges by municipalities having no hospitals.

An exhaustive discussion of the whole subject of Health Insurance, at which Dr. Allan Peebles, the provincial government's technical adviser on Health Insurance, was present, left several of the delegates unconvinced as to the effect which the proposed Act would have on the hospitals of the province. Dr. Peebles declared emphatically that under the Health Insurance Act proposed the hospitals would be no worse off financially than they are at present.

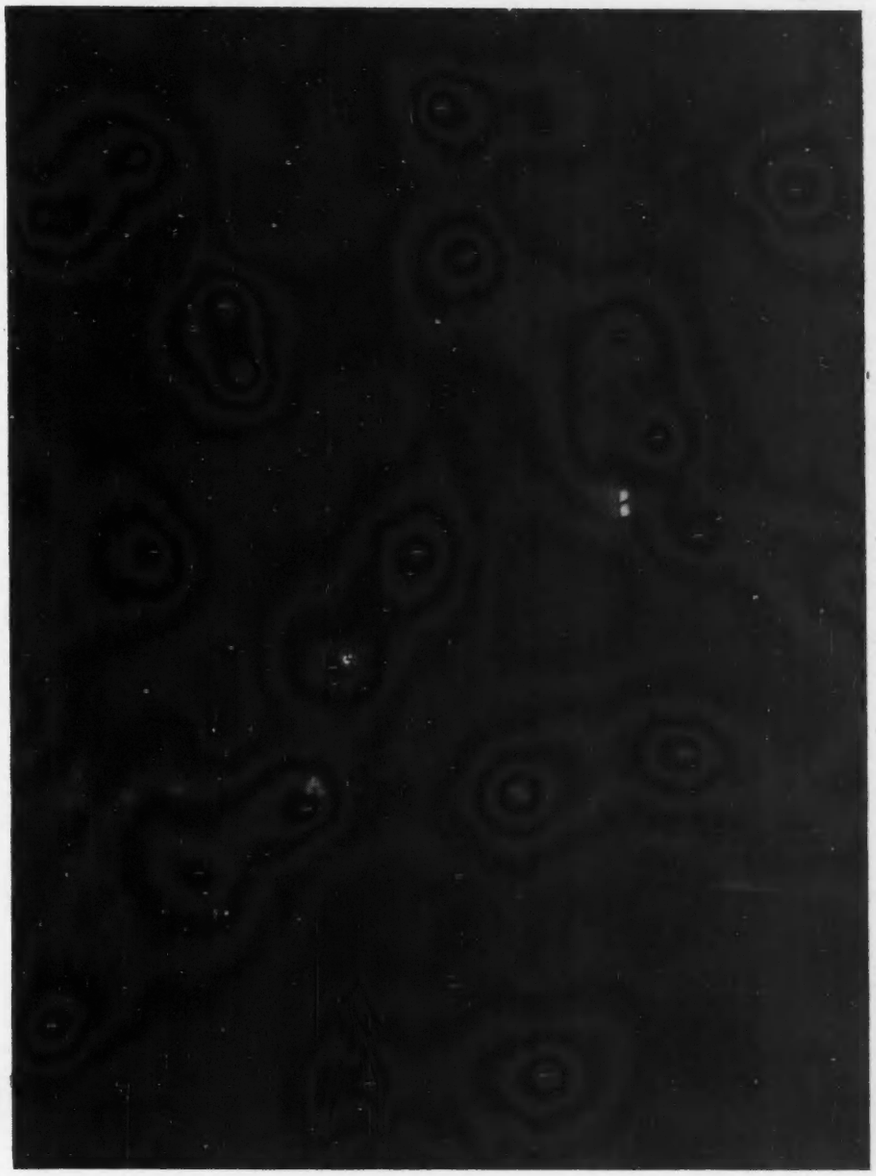
Hon. Dr. G. M. Weir, Provincial Secretary, delivered a half hour radio address on Health Insurance on November 28th over the British Columbia network. He stated that time for Health Insurance was not only ripe but it was "over-ripe". He dwelt at length and with emphasis on the benefits that would accrue to the people of British Columbia, which province he stated was the richest per capita of any in Canada, under his plan of Health Insurance. It would no longer be necessary for people to descend to a state of pauperism in order to obtain necessary medical services, or as a result of attempting to pay for such services. He stressed the great extension of preventive measures, up to the present, according to Dr. Weir, largely neglected, rather than merely the treatment of diseases already existing. Dr. Weir stated that 75 per cent of all current disease is preventable. He also made much of the idea that there has been a great deal of physical deterioration and increase of disease due to the impaired nutrition, etc., of the population consequence upon the economic depression. He reported, as on many previous occcasions, that there was no necessity for a Royal Commission to investigate Health Insurance any further. He said that health was primarily a provincial matter, although considering that preventative measures could be more effectively dealt with by federal supervision, and that in British Columbia all the essential data concerning Health Insurance were already at hand no further investigation was necessary. The idea of a Royal Commission was merely a "red herring across the trail" and a "stalling device" being introduced by those opposed, in order to delay action. He further stated that the experts already consulted were as good as any that could be called in by the Federal Government to sit on a commission. The criticism that the proposed bill was actuarially unsound could only be considered as ludicrous. He was aware that his fellow-members in the Legislature were being subjected to approaches inducing them to defeat this measure, and that, as it was chiefly upon this plank in their platform that the Liberal Government were elected in 1933, a defeat of this measure at present to go before the House would be disastrous. He adjured them to thoroughly examine the revised Act before they formed any conclusions. The minister made a special appeal to the members of the medical profession who were listening to him from outlying communities to recall the report of the Canadian Medical Association in 1934 favouring provincial control of health matters, which was the opinion of the clearest minds in the Canadian Medical Association. It was apparent throughout the address that the revised Bill, and not the one placed before the public for consideration, was being referred to. Except that, as Dr. Weir stated, in many respects this Bill did not go as far as he would wish there was no other indication as to the manner in which the Bill had been modified. In conclusion the speaker stated that 20 per cent of the professional classes were not opposed to a "reasonable measure" of Health Insurance and that the majority of doctors he knows are broad-minded men who favour Health Insurance.

D. E. H. CLEVELAND

Manitoba

A meeting of the medical profession of Winnipeg was held in the Medical College on November 29th, to discuss a proposed revision of surgical fees for doctors attending relief patients. Under the suggested schedule the fees for major surgery will be $25.00 to $35.00; fractures and minor surgery will remain as before; tonsillectomy, $10.00; examinations for glasses to be made by oculists, for which a fee of $5.00 will be paid. This scale has been accepted by the special committee on Unemployment Relief of the City Council. The meeting ratified this schedule and it went into effect on December 5, 1935.

A motion with regard to the fee schedule for maternity cases presented from the Obstetrical and Gynæcological Section of the Winnipeg Medical Society was referred to the Committee on Sociology of the



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Manitoba Medical Association, with the suggestion that if possible the Committee should arrange that the City have pre-natal visits paid for at a cost not to exceed $5.00 for a case.

The arrangement between the doctors of Winnipeg on the one hand and the Unemployment Relief Department of the City of Winnipeg on the other has now been in force for about twenty-one months and appears to be working out well. There have been difficulties, of course, but so far the Committee on Sociology of the Manitoba Medical Association and the Advisory Board, composed of the City Medical Health Officer and City Relief Officer with two representatives from the Committee on Sociology, have been able to adjust matters satisfactorily. The profession appears to be behind Dr. Moorhead, who is the Chairman of the Sociology Committee. Dr. Elliott has made an analysis of the medical services rendered but his report is not yet available.

The Faculty of Medicine, University of Manitoba, has arranged a course in Clinical Physiology to be held during the winter months. This course will deal with the practical application of modern physiology to diagnosis and treatment, and will consist of fourteen lectures, commencing on January 8, 1936. Dr. Alvarez, of Rochester, Minn., has kindly consented to give one lecture on "Physiology of the gastro-intestinal tract".

Registration is limited to 30 and the entrance fee is $15.00.

At the annual meeting of the Honorary Attending Staff of the Winnipeg General Hospital the following officers were appointed: *Chairman,* Dr. J. D. McQueen; *Vice-chairman,* Dr. O. S. Waugh; *Secretary,* Dr. John M. MacEachern; *Representative to Advisory Board,* Dr. J. D. McQueen; *Representative to Training School Committee,* Dr. E. S. Moorhead.

Dr. Digby Wheeler has been appointed radiologist to St. Boniface Hospital.

St. Boniface Hospital is installing a new entrance for ambulance cases and a fast new central elevator.

ROSS MITCHELL

New Brunswick

On December 3 last, Dr. G. A. B. Addy was host to the Saint John Medical Society at a dinner in the Admiral Beatty Hotel. Dr. Addy has announced his retirement from active practice at the first of the year. He took this opportunity to entertain his colleagues in the city of Saint John. Dr. Addy has been in practice in the city for forty-five years and has made a place in the hearts of his confrères that is rarely the lot of anyone to attain. Old and young in the profession in Saint John owe much to Dr. Addy for his kindness, help and advice at various times in their professional work. Dr. Mayes Case proposed a toast to the host in his usual facile and pleasant manner. Dr. Addy's reply took the form of reminiscences covering his long years of practice. Dr. J. M. Barry, on behalf of the Saint John Medical Society, presented a piece of sterling silver suitably engraved. Other speakers included His Hon. Lieut.-Governor, Dr. Murray MacLaren, Dr. W. W. White, Dr. G. G. Corbet, Dr. Stanley Bridges, Hon. Dr. W. F. Roberts, Dr. D. C. Malcolm, Dr. J. R. Nugent. A feature of the evening was the presentation of a series of cartoon sketches, the material and presentation of which was due to the thought of Dr. J. R. Nugent.

Dr. W. J. Baxter, President of the Saint John Medical Society, was in the chair. Practically 100 per cent of the membership of the Society attended, and the eulogies presented were the heart-felt expressions of esteem of a medical group which is practically without equal for cohesion and esprit de corps in the Dominion Dr. Addy has done much to foster this spirit among the profession in his native town.

Hon. W. F. Roberts has been appointed acting-premier, due to the absence of Premier Dysart at Ottawa.

Dr. O. B. Evans, of the surgical staff of the Saint John General Hospital, has been a patient in that institution for some time, suffering from a hand infection.

As a bequest from the late Dr. William Ferguson, the Moncton City Hospital has received a very interesting and valuable collection of books from his library. The Library Committee of this hospital has been active for some time and this large addition was most gratefully received.

On November 20th the Quarterly Meeting of the Association of Officers of the Medical Services of Canada, New Brunswick Branch, was held in Saint John. A large attendance was present, including several out-of-town physicians. Dr. D. C. Malcolm was chairman. The speaker of the evening was Dr. G. G. Corbet, who gave an address on features of the battle of Bannockburn.

A. STANLEY KIRKLAND

Nova Scotia

A site for a community hospital in the Town of Lunenburg has been acquired by a Committee formed some time ago with this object in view. The property of H. H. McIntosh has been purchased and will be remodelled for hospital purposes. The initial installation of six beds, with a staff of two nurses, will be sufficient for present needs. Generous donations to the hospital have been received.

In the Town of Amherst a Tuberculosis Annex has been made available by the presentation to the Town Council of the property of the late J. R. Lamy. A special committee consisting of two physicians and one lay representative will inspect the property and advise upon the suitability for this purpose.

Dr. D. A. MacLeod, of Sydney, has been appointed District Pensions Medical Examiner, with headquarters at Camp Hill Hospital, in succession to the late Dr. W. P. Mackassey. Dr. MacLeod formerly acted as representative in Sydney for the Department of Pensions. During the War he served abroad with the Dalhousie Hospital Unit.

Dr. J. G. MacDougall, of Halifax, has been appointed to the Board of Regents of the American College of Surgeons. He is the only Maritimer to hold such a position.

The death of Dr. M. A. B. Smith, of Dartmouth, at the age of seventy-five removes one of the oldest practitioners in Nova Scotia. For over fifty years he practised his profession. Shortly before his death he was elected an Honorary Member of the local branch of the Nova Scotia Medical Society.

Medical men who have changed their location of practice are the following. Dr. Hugh MacKinnon, of Berwick, following a year's post-graduate work in England, has sold his practice to Dr. R. A. Moreash. Dr. Frank Hebb, of Liverpool, N.S., is leaving shortly for England to undertake post-graduate studies, following which he will resume practice in England. Dr. Douglas Murray will succeed him in his practice in Liverpool.

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Ontario

Dr. Geo. E. Wilson, Chief of the Department of Surgery, St. Michael's Hospital, Toronto, was named Vice-president of the American College of Surgeons, at the recent meeting in San Francisco.

The first annual meeting of the Fort William Sanatorium was held on November 26, 1935. The Sanatorium closed its first fiscal year on September 30th. One hundred and seventeen cases have been treated, 26 from Fort William, 30 from Port Arthur and 61 from outside points. It was pointed out that Fort William patients in the Sanatorium who had been taken care of by the city had cost the city $3,385, while the same service rendered to Fort William patients who were forced to go down east last year cost the city $4,689.

Recognizing tuberculosis as an infective disease, the St. Catharines Board of Health have asked that all patients with tuberculosis be treated in hospital or sanatorium at the expense of the city. It is felt that this will lessen materially infection in the home.

Radium valued at $12,000 has been sent to the Windsor General Hospital for the establishment of the cancer clinic, on the understanding that Windsorites subscribe $15,000 for equipment. In a three day drive, there were subscriptions for $54,000. The fund over and above the $15,000 needed to equip the cancer clinic will be divided between the Red Cross Society and the Victorian Order of Nurses.

Capt. H. B. Kenner, of Stratford, Medical Officer of the Perth Regiment, has been presented with a life membership in "The Grand Priory in the British Realm of the Venerable Order of the Hospital of St. John of Jerusalem".

Dr. T. H. Leggett, of Ottawa, was re-elected President of the Ottawa Valley Graduates Society of McGill University at its 47th annual meeting.

It seems probable that the eastern part of Ontario may soon have a much needed sanitarium for the treatment of tuberculosis. The Religious Hospitallers of St. Joseph are willing to invest $100,000 in the sanitarium and be responsible for the maintenance of the institution after it is erected if the counties of Stormont, Dundas and Glengarry, Prescott and Russell, and the Province of Ontario will assist in the initial financing. The operation of the sanitarium will be financed through the statutory grant from the Province of Ontario and the statutory per diem allowance from the municipalities liable for the maintenance of indigent patients.

J. H. ELLIOTT

The Hon. Dr. J. A. Faulkner has announced the introduction of new features into the campaign against tuberculosis in Ontario that should make for increased efficiency. The Tuberculosis Division under Dr. G. C. Brink is organizing four additional clinics. These will consist of a doctor trained in tuberculosis who will be provided with a portable x-ray unit and technician. These clinic centres will be North Bay, Fort William, Ottawa and Belleville. They will provide a regular service to these centres throughout the year to the doctors practising in these areas. They will also assist in the supervision of diseased patients and the examination and supervision of contacts.

Dr. J. G. FitzGerald, Director of the School of Hygiene and Connaught Laboratories, University of Toronto, has been made a member of the Permanent Commission on Biological Standardization of the Health Organization of the League of Nations.

Saskatchewan

At the annual meeting of the American Association for Thoracic Surgery Dr. R. H. Macdonald, of Saskatoon, was elected to associate membership. The membership of this association is limited to 100 active members and to about 25 associate members.

Dr. H. L. Jakes addressed the staff of the Regina General Hospital on Diseases of the Rectum. Dr. D. S. Hart and Dr. G. H. Ramsey spoke on arthritis, with special reference to the hyperthermia treatments recently given in the Regina General Hospital.

Dr. R. H. Riley, pathologist, has been given a month's leave of absence by the Board of Governors of the Regina General Hospital in order to study the ensol treatment of cancer in Kingston.

Miss Hazel Hart, B.A., a graduate of Mount Allison University, who for eight years has been editor of *The Valley Echo*, the official organ of the Saskatchewan Anti-Tuberculosis League, has been appointed assistant secretary of the Canadian Tuberculosis Association at Ottawa.

LILLIAN A. CHASE

United States

The American Association for the Study of Goitre again offers the Van Meter Prize Award of $300.00 and two honorable mentions for the best essays submitted on the goitre problem. This award will be made at the discretion of the Society at its annual meeting, to be held in Chicago, Illinois, on June 8th, 9th, and 10th.

The competing manuscripts, which should not exceed 3,000 words in length, must be presented in English, and a typewritten double-spaced copy sent to the Corresponding Secretary, Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than March 1, 1936. Manuscripts received after this date will be held for competition the next year or returned at the author's request.

The Committee who will review the manuscripts is composed of men well known in the fields of research and clinical investigation of problems related to the thyroid gland. This Committee did not consider any of the manuscripts submitted at the last annual meeting to be of a calibre to justify the award, and consequently the award for the year 1935 was withheld by the Association.

The Association will publish the manuscript receiving the prize award in their annual Proceedings, and reserve a place on the program of the annual meeting for presentation of the manuscript by the author, if it is possible for him to attend. This will not prevent its publication, however, in any journal selected by the author.

General

International Medical Post-Graduate Courses in Berlin.—The Berliner Akademie für ärztliche Fortbildung, the successor of the Dozentenvereinigung für ärztliche Fortbildung in Berlin, which is managed by the Chief Burgomaster of Berlin, is holding the following medical post-graduate courses in the spring of 1936:

1. Course on the practical results of recent research work in the domain of internal medicine (24th February to 4th March). Fee: 50 RM.

2. Syphilis of the internal organs (5th to 7th March). Fee: 20 RM. (Fee for courses 1 and 2 together, 60 RM.).

3. Course in tuberculosis in the City of Berlin's Tuberculosis Hospital "Waldhaus Charlottenburg" in Sommerfeld (16th to 21st March). Fee: 50 RM.

4. A week's post-graduate course in obstetrics and gynæcology (23rd to 28th March). Fee: 50 RM.

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5. Practical progress of x-ray diagnosis and radiotherapy, with regard to clinical, pathological-anatomical and physiological points of view (9th to 14th March). Fee: 70 RM.

6. A week's course in abdominal surgery (20th to 25th April). Fee: 70 RM.

7. Introductory course in homœopathy (20th April to 16th May). Fee: 70 RM., (40. RM. for assistant surgeons).

8. Special courses in all branches of medicine with practical work at the bedside and in the laboratory are held every month. The fee is 50 to 80 RM. for eight periods of two hours. In these courses special importance is attached to practical work; theoretical postgraduate training occupies a secondary position, but is of course not neglected.

Courses 1 to 7 will be held in German, and the special courses also in foreign languages.

For programs and further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung, Berlin NW 7, Robert Koch-Platz 7 (Kaiserin Friedrich-Haus).

Foreign doctors and German doctors resident abroad are granted a reduction of fare of 60 per cent on the German Railways lines. A foreign doctor can reduce the cost of his stay considerably by utilizing what are called "registered marks". It is advisable to arrange matters with the local bank *before* starting.

Book Reviews

The Stomach and Duodenum. G. B. Eusterman, M.D., F.A.C.P., Head of Section in Division of Medicine, and D. C. Balfour, M.B., M.D., LL.D., F.A.C.S., F.R.A.C.S., Head of Section in Division of Surgery, Mayo Clinic. 958 pages, illustrated. Price $11.50. Saunders, London and Philadelphia; McAinsh, Toronto, 1935.

This book is an account of all that is known about the stomach and duodenum, written by the heads of the medical and surgical divisions of the Mayo Clinic and their Associates. The subjects are very well arranged and the illustrations of surgical operations are particularly clear and instructive. The conclusions drawn are based on experimental work done and on the results of medical and surgical treatment of a large number of patients at the Mayo Clinic over a long period of years.

The medical and surgical treatment of duodenal and gastric ulcer and of carcinoma of the stomach are taken up at length and the results of the authors' experiences given. The consideration of each one of the subjects is preceded by a chapter entitled General Considerations, and there a vast array of interesting facts concerning the different lesions are brought together, which is of great interest and value. There is a chapter on experimental work, which is of particular interest, written by the man who did the work and who is recognized as a pioneer in this field; there are others on surgical pathology and such subjects as achlorhydria and gastritis and the anæmia following operations on the stomach. There are also chapters on each one of the complications of ulcer, hæmorrhage, perforation, obstruction, hour-glass deformity and carcinomatous transformation of gastric ulcer, and there is also a long and interesting chapter on the late sequelæ of the surgical treatment of lesions of the stomach and duodenum.

The criticism of the text itself might be made that sometimes the language used in descriptions is rather involved, and that some chapters, particularly those dealing with post-mortem examinations and test meals, are too long. Some of the diagrams, especially those illustrating the various percentages of volume and acidity of gastric secretion, are difficult of interpretation, and there are a few strange words used, such as "tabagism", meaning chronic abuse of tobacco, and "caval" circulation, meaning the circulation in the (inferior) vena cava.

Of the great value of the book there can be no doubt. It contains, unquestionably, all there is to know on this subject, and is so well arranged and illustrated that it will be an easily accessible and an authoritative source of information for all those interested, whether physician, surgeon, medical student, or teacher.

Theory and Practice of Anæsthesia. M. D. Nosworthy, M.A., M.D., B.Ch., Anæsthetist to Westminster Hospital. 208 pages, illustrated. Price 12/6 net. Hutchinson Co., 34 Paternoster Row, London, E.C.4, 1935.

The author has endeavoured to provide a practical guide for the beginner in anæsthesia; and for this reason, although the theoretical is amply dealt with, yet the emphasis is on the practical side and much consideration is given to the pitfalls which await the beginner in this art. All of the commoner agents used in anæsthesia are considered in detail as well as the newer ones, *e.g.*, cyclopropane and divinyl ether.

The author strongly deprecates the use of evipan for operations other than of a minor character. This is salutary in view of the present trend, at least in the author's country, to employ it for anything and everything which may be attempted under the anæsthesia afforded by it. He points out that an intravenous anæstheetic is at best to a degree beyond the control of the anæsthetist, and it is foolhardy to employ it in a case where shock is liable to develop during the course of the operation. In addition the use of preliminary depressants, *i.e.*, morphia or its derivatives, which appear to be necessary when it is used for prolonged cases, is an example of superimposing one respiratory depressant on another, often with disastrous results.

A good description of the carbon dioxide absorption technique is given, of which method the author heartily approves. A description of his own apparatus for this technique is included. No consideration is given to regional anæsthesia apart from spinal anæsthesia, but such is hardly to be expected in a book of this nature.

The bibliography at the end of each chapter and the references in the text are an extremely valuable feature of this handbook.

The Diary of Robert Hooke, M.A., M.D., F.R.S., 1672-1680. Transcribed from the Original in the Possession of the Corporation of the City of London (Guildhall Library). Edited by Henry W. Robinson, Librarian of the Royal Society, and Walter Adams, B.A. 527 pages, illustrated. Price 25s. Taylor and Francis, London, 1935.

Students of social life and those interested in the history of natural science will welcome this, the latest, addition to the ranks of the "diarists". In reading this book one is inevitably reminded of Pepys, but not without a thought for Evelyn and Aubrey, for all three were contemporaries and deal with the personalities and events of the same notable period in English history. Admirers of Pepys, to whom Hooke comes nearest, will miss the former's literary quality, his amiable discursiveness, and his fullness, but will agree that both writers have this in common, that they manifest a naive and ingenuous faculty for self-revelation. Unlike Pepys, Hooke is "scrappy" and disjointed. Indeed, it might be maintained that his "Diary" is not a diary at all, unless it be sufficient that a record of events arranged chronologically constitutes a diary. Hooke himself calls his work "memoranda". However, we hear of the same events and meet the same familiar figures—Sir Christopher Wren, Lord Brouncker. Sir William Petty, Dr. Needham, Dr. Grew,

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Sir George Ent, and Sir Charles Scarborough, to mention only some, and the discerning reader can cull much of value from Hooke's "Diary".

The diary, as published, does not contain all that Hooke set down. The period originally covered is from March 10, 1671/2 to May, 1683. The first part is chiefly concerned with the weather and the notes made during the last two and a half years are imperfect and unimportant. Accordingly, the editors have wisely omitted all this, and the record, as we have it, begins on August 1, 1672, and ends on December 31, 1680.

Robert Hooke was born on July 18, 1635, and, by a happy coincidence, his diary was published within two or three weeks of his anniversary. The Diary gives a list of the members of the Royal Society in 1671, comprising some two hundred and twenty names. Among them are some few whom we might class as scientific men—Robert Boyle, Francis Glisson, Nehemiah Grew, Hooke, himself, Richard Lower, Marcello Malpighi, Walter Needham, Thomas Willis, and Christopher Wren. Most of the others were mere dilettanti, and it is not unfair to say that to Hooke more than anyone else should go the credit of maintaining the Royal Society as a scientific body; without him it might have degenerated into a mere debating society. As Curator his special duty was to perform experiments, and so extraordinary were his industry and mental capacity that he was able to announce and demonstrate discoveries at almost every meeting, some of which are of great value, even today. Hooke was the first to describe the cellular structure of plants, and in his theories about light and combustion he anticipated many modern hypotheses; he invented means for the accurate measurement of temperature, time, and longitude; he invented an air pump which was the prototype of the atmospheric engine of Newcomen and so of the steam engines of Watt and Stephenson; his anchor escapement brought about a revolution in clock-making; his balance spring, still found in our wrist-watches, made possible the chronometer; he invented the wheel-barometer; his Law of Springiness (*ut tensio si vis*) forms the basis for the theory of elasticity as employed by engineers; and his "joint" is an essential feature in the transmission gear of many automobiles. Hooke has been called "The Father of Microscopy"; Dr. H. T. Gunther, of Magdalen College, Oxford, proposes to call him "The Father of the Industrial Age".

Hooke was also a surveyor and architect of merit. He built Bethlehem Hospital (Bedlam) in Moorfields, the College of Physicians in Warwick Lane, the mathematical section of the Bluecoat School and of the Merchant Taylors' School in Suffolk Lane, and the "pillar", otherwise, the Monument, on Fish Street Hill.

The Diary reveals Hooke as a chronic invalid. He seems to have been a martyr to chronic septic absorption, probably from infection of his frontal sinuses; he was a chronic dyspeptic and a scoliotic. No wonder he was crabbed, jealous, irritable and morbid. The first entry we have is "drank iron and mercury". Though a scientific man, in the true sense of the word, and a Doctor of Medicine, he was a child of his age in matters medical, and we find him dosing himself with all sorts of drastic and nauseous remedies. We need not particularize. On February 23, 1677/78 he "Drank burnt white wine. It scoured me", and on March 14th, following, he was "mightily eased by a little pewk". He records without comment that Madam Tillotson told him that "a soveraine remedy for the falling sickness was made out of the mosse of a man's scull", and "At the Crown Sir Christopher Wren told of killing the worms with burnt oyle (elsewhere mentioned) and of curing his Lady of a thrush by hanging a bag of live boglice about her neck", and "Mr Wild told me that the blood of a black cat would cure chilblains".

We get some informative "side-glances"—"Tuesday, Dec. 19, (1676) 'Mr. Pepys, Master of Trinity House, made a Long Speech to noe great purpose'." Hooke, too, was very human and we find him, on occasion, like his illustrious contemporary, just mentioned, descending from the high altitudes of philosophic speculation to indulge in more mundane pleasures. Certainly, he was no ascetic.

Not a few of the entries are concerned with Hooke's discoveries and inventions, and to some these may appeal as the most important part of the record.

Enough has been said to indicate the scope of this book and to whet the appetite for a greater knowledge of it. It is the record of a great genius.

Hospital Organization and Management. Malcolm T. MacEachern, M.D., C.M., D.Sc., F.A.C.P., F.A.C.H.A., Associate Director, American College of Surgeons and Director of Hospital Activities. 944 pages, illustrated. Price $7.50. Physicians' Record Co., Chicago, 1935.

This long-awaited work by one of the foremost living authorities on hospital management and procedure meets a real need in the hospital field. Since leaving the Vancouver General Hospital for the broader field of international hospital service, Dr. MacEachern has had a most unusual opportunity to study hospital organization and management and it is doubtful if any individual has ever had as intimate a knowledge of the various problems in hospital work or has so effectively contributed to their solution.

In this pretentious volume the author covers a wide range of hospital topics. These vary from the engineering department to the education of the public. Of most interest to the medical staff are the extensive chapters on professional activities. Those dealing with the organization of the medical staff, with staff meetings and conferences, with staff regulations and with the development and use of hospital records are most helpful. Selected routine technique and orders for various departments, equipment lists, and dressing and other standards are given. The organization and duties of the administrative and nursing staffs, of ward attendants, and of orderlies are elaborated.

Of particular interest to the medical staff is the section on ethics. There has long been a need for a clarification of the ethics of hospital practice, of the relationship of hospitals to each other and to the community. This chapter is particularly well done. This work should prove an invaluable handbook for the desk of every hospital administrator and should be read by every doctor interested in the welfare of his hospital.

Preventive Medicine and Hygiene. Milton J. Rosenau, Professor of Preventive Medicine and Hygiene, Harvard Medical School. Sixth edition, 1,481 pages. Price $10.00. D. Appleton-Century, New York, 1935.

This, the sixth edition of a book which through sheer merit has come to be accepted as the authoritative book of reference in its field, appears at the time that its distinguished author relinquishes his teaching responsibilities at Harvard Medical School. It is a matter of satisfaction to find that this latest edition excels those which have appeared before. Doctor Rosenau has maintained his rare judgment as to the inclusion of new material. Rightly, he has avoided those things which, however promising and attractive, cannot be accepted as proved. Just as rightly, he has added material and chapters which keep the book up-to-date in the newer fields of public health, such as mental hygiene, heart disease, and so on. This has been done without increasing the size of the book, which is well-printed. The index is extensive, as it should be in a book of this type, and the references at the end of each chapter will be appreciated. Every public health worker will want to have this new edition beside him, and most practitioners of medicine would find it a valuable addition to their library if for nothing more than the first third of the volume which deals with the communicable diseases.